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THE WORKS

OF

GEORGE BERKELEY, D. D.

FORMERLY BISHOP OF CLOYNE;

INCLUDING

MANY OF HIS WRITINGS HITHERTO UNPUBLISHED.

With Prefaces, Annotations,

His Life and Letters, and an Account of his Philosophy,

BY

ALEXANDER CAMPBELL FRASER, M. A.

PROFESSOR OF LOGIC AND METAPHYSICS IN THE
UNIVERSITY OF EDINBURGH.

IN FOUR VOLUMES.

VOL. III.

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ERRATA.

Page 9, note 1, line 5, *for* 'twenty-three' *read* 'twenty-two.'
Page 215, note 1, ll. 12, 13, *delete* 'then at Bath.'
Page 257, note, ll. 3, 4, *for* 'for the month in which' *read* 'a few weeks after.'
Page 455, note 1, l. 2, *delete* 'as it seems, in the *Dublin Journal*.' [See Appendix B.]

MISCELLANEOUS WORKS.

LATIN.

ARITHMETICA

ABSQUE

ALGEBRA AUT EUCLIDE

DEMONSTRATA.

AUCTORE * * * * ART. BAC. TRIN. COL. DUB.

1707.

MAXIMÆ SPEI PUERO,

D. GULIELMO PALLISER,

REVERENDISSIMI ARCHIEPISCOPI CASSELENSIS[1]

FILIO UNICO, INGENIO, SOLERTIA, ERUDITIONE,

ANNOS LONGE PRÆEUNTI,

NUMERISQUE ADEO OMNIBUS AD PRÆSTANDUM,

INGENS ALIQUOD SCIENTIIS LUMEN AC INCREMENTUM NATO,

HUNC ARITHMETICÆ TRACTATUM,

IN EXIGUUM SUMMI AMORIS PIGNUS,

OFFERT ET DICAT

AUCTOR.

[1] William Palliser, translated to the Archbishoprick of Cashel in 1694, was previously Bishop of Cloyne. He had been elected a Fellow of Trinity College, Dublin, in 1668, and was tutor to William Molyneux, the friend of Locke, father of Samuel Molyneux, to whom Berkeley dedicated his *Miscellanea Mathematica*. Palliser was afterwards Professor of Divinity in Trinity College. He died in 1727. Of the younger Palliser, to whom the *Arithmetica* is dedicated, nothing further of interest is recorded.

PRÆFATIO.

Plerosque scientiarum mathematicarum procos in ipso earundem limine cæcutientes, sentio simul et doleo. Nimirum cum ea sit, apud nos saltem, mathemata discendi ratio, ut primo arithmetica, deinde geometria, postremo algebra addiscatur, Tacqueti[1] vero *Arithmeticam* legamus, eam autem nemo probe intelligat, qui algebram non prælibarit, hinc fit ut plerique mathesi operam navantes, dum bene multorum minoris usus theorematum demonstrationes studiose evolvunt, interea operationum arithmeticarum, quarum ea est vis et præstantia, ut non modo cæteris disciplinis mathematicis, verum etiam hominum cujuscunque demum sortis usibus commodissime famulentur, principia ac rationes intactas prætereant. Quod si quis tandem aliquando, post emensum matheseos cursum, oculos in prædictum Tacqueti librum retorqueat, multa ibi methodo obscura, et quæ intellectum non tam illuminet quam convincat, demonstrata; multa horrido porismatum et theorematum satellitio stipata inveniet.

Sed nec alius quisquam, quod sciam, arithmeticam seorsim ab algebra demonstravit. Proinde e re tyronum futurum ratus, si hæc mea qualiacunque in lucem emitterem, ea postquam, si minus omnia, pleraque certe per integrum fere triennium in scriniis delituerint, publici juris facio. Quæ cum præter ipsos operandi modos, eorundem etiam demonstrationes ex propriis et genuinis arithmeticæ principiis petitas complectantur, mirabitur fortasse quispiam, quod noster hic tractatus mole vulgares arithmeticorum libros, in quibus praxis tantum tradatur, haud exæquet. Hoc autem exinde provenit, quod cum operationum τὸ διότι explicarem in præceptis et exemplis, quæ vulgus arithmeticorum ad nauseam usque prosequitur, contractior fui; nec eo forsan obscurior. Quippe tametsi

[1] For Tacquet, an eminent mathematician of the seventeenth century, cf. *New Theory of Vision*, sect. 30, note. He is often referred to by contemporary writers. See Spinoza's letter to De Vries (*Epistola* XXVI). His *Arithmeticæ Theoria et Praxis*, upon which Berkeley here remarks, was published at Antwerp in 1665.

cæco ad singulos fere gressus regendos opus sit manuductore, in clara tamen demonstrationum luce versanti sufficit, si quis tenendum tramitem vel strictim exponat. Quamobrem omnes matheseos candidati ad regularum arithmeticæ rationes ac fundamenta percipiendum animos adjungant, summopere velim et exoptem.

Neque id tanti moliminis est, ut plerique fortasse imaginentur. Quas attulimus demonstrationes faciles (ni fallor) sunt et concisæ; nec principia aliunde mutuantur, ex algebra nihil, nihil ex Euclide tanquam notum supponitur. Ubique malui obvia et familiari aliqua ratione a priori veritatem praxeos comprobare, quam per prolixam demonstrationum apagogicarum seriem ad absurdum deducere. Radicum quadratarum et cubicarum doctrinam ex ipsa involutionis arithmeticæ natura eruere tentavi. Atque ea, meo quidem judicio, ad numerosam radicum extractionem illustrandum magis accommoda videtur, quam quæ ex elemento secundo Euclidis, aut ex analysi potestatum algebraicarum vulgo adferri solent. Regula vulgaris pro alligatione plurium rerum non nisi difficulter admodum et per species demonstratur: ejus igitur loco novam, quæ vix ulla demonstratione indigeat, e proprio penu substitui. Regulam falsi, utpote mancam et fere inutilem, consulto prætermisi. Ac, si nihil aliud, novitas fortassis aliqua placebit.

Neminem transcripsi; nullius scrinia expilavi. Nempe id mihi imprimis propositum fuerat, ut numeros tractandi leges ex ipsis principiis, proprii exercitii et recreationis causa, deducerem. Quod et deinceps horis subsecivis prosecutus sum. Nec mihi hoc in loco, absque ingrati animi labe, præterire liceat Reverendum Virum Johannem Hall[2], S.T.D. Academiæ nostræ Vice-præpositum, ibidemque linguæ Hebraicæ Professorem dignissimum. Cui viro optimo quum me multis nominibus obstringi lubens agnoscam, tum non id minimum duco, quod illius hortatu ad suavissimum Matheseos studium incitatus fuerim.

Monstravi porro ad quem collimaverim scopum: quousque ipsum assecutus sim, penes æquos rerum æstimatores esto judicium. Candido quippe horum examini istas studiorum meorum primitias libenter submitto; quicquid interim scioli sentiant et malevoli, parum solicitus.

[2] John Hall, elected Fellow of Trinity College, Dublin, in 1685, was afterwards Berkeley's tutor. He was Vice-Provost of the College, 1697–1713. Berkeley here attributes to him his own early enthusiasm for mathematics. In 1713 Hall was appointed to a college living in the diocese of Derry. He died in 1735.

ARITHMETICÆ[1]

PARS PRIMA.

CAP I.

DE NOTATIONE ET ENUNCIATIONE NUMERORUM.

NOVEM sunt notæ numerales, *viz.* 1, 2, 3, 4, 5, 6, 7, 8, 9, quibus una cum cyfra (0) utuntur arithmetici, ut tantum non infinitos numerorum ordines exprimant. Omne illius rei artificium in eo positum est, quod notarum numeralium loci ratione decupla progrediantur. Series autem numerorum, ea lege quoad locorum valores procedentium, in membra sive periodos enunciationis causa secatur. Rem totam oculis conspiciendam subjecta exhibet Tabella:

[1] This treatise on 'Arithmetic' is the first proof Berkeley gave to the world of his literary ability. It must have been published early in 1707, when he was twenty-three years old, for he took his Master's degree in June of that year, and on the title-page he is designated Bachelor of Arts. From the preceding Preface much of the work seems to have been prepared three years before it was published.

In the original edition, now very rare, the *Arithmetica* and *Miscellanea Mathematica* form together a small anonymous volume of 92 pages. Neither of them is contained in the *Miscellany* of his smaller works which Berkeley published in 1752. They both appear, however, in the various collected editions of his works; and, as additional proof of their authorship, we have the evidence of their contents, as well as of Berkeley's MS. Common-place-book.

Both the *Arithmetica* and the *Miscellanea Mathematica* are marked by the originality, ingenuity, and simplicity which are characteristic of their author. They give internal evidence of the truth of what he says in the Preface to the former—*Neminem transcripsi; nullius scrinia expilavi.* And they express his juvenile enthusiasm in those mathematical sciences which, nearly thirty years afterwards, involved him in a famous controversy.

The treatise on *Arithmetic*, not unworthy of study at the present day, is a brief system of the science, unfolded simply and ingeniously from its principles—in three parts. The First Part deduces the elementary rules for the Addition, Subtraction, Multiplication and Division of numbers, with the theory and rules of Squares and Cubes; the Second treats of Fractions or broken numbers, and the theory of the rules for adding, subtracting, multiplying, dividing, and reducing them; the Third is concerned with the numerical relations of proportion, alligation, and progression—arithmetical and geometrical.

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qua exponitur notarum numeralium series, in terniones distributa:

membra autem seu periodi millecupla, loci decupla ratione progrediuntur. *E. g.* Numerus positus in loco unitatum (is per subjectum punctum dignoscitur) denotat septem res integras quascunque, vel saltem ut integras spectatas; numerus ei a dextris proximus, tres partes decimas ejusdem integri; qui vero locum immediate præcedentem occupat, indigitat quatuor decadas eorundem integrorum. Eadem proportione decupla locus quilibet sequentem superat, a præcedente superatur.

Porro, cum infinita unitatum multiplicatione et divisione, notarum series infinite ultra citraque unitatum locum producatur, adeoque innumeri oriantur loci, ut distincti eorum valores exprimantur, opus est solummodo trium vocum continua repetitione; modo ternio quivis sive periodus suo insigniatur nomine, uti factum in Tabella. Nam, progrediendo a loco unitatum versus sinistram, prima periodus numerat simpliciter unitates, sive integra; secunda, millia; tertia, milliones; quarta, biliones; atque ita porro. Similiter, servata analogia, in periodis infra unitatem descendentibus, occurrunt primo partes simpliciter, dein millesimæ, millionesimæ, bilionesimæ, &c. atque hæ quidem partiendæ in unesimas, decimas, centesimas; illi vero colligendi in unitates, decades, centurias.

Ut itaque enunciemus numerum quavis e tota serie figura designatum, 1°, respiciendum est ad valorem notæ simplicem; 2°, ad valorem loci; postremo, periodi. *E. g.* enuncianda sit 9, in quinta sinistrorsum periodo. Nota simpliciter sumpta valet novem: ratione loci, novem decadas; ratione demum periodi, novem decadas trilionum. Proponatur 5, in tertia periodo: simpliciter sumpta dicit quinque; ratione loci, quinque unitates; ratione periodi, quinque unitates millionum, seu quinque milliones. In secunda infra unitatem periodo, detur 8: simplex notæ valor est octo; ratione loci, octo centesimæ; ratione periodi, octo centesimæ millesimarum.

Quod si numerus enunciandus non habeat adscripta vocabula valores periodorum locorumque indigitantia, is punctatione a loco unitatum dextrorsum sinistrorsumque instituta in terniones distinguatur; deinde, cuique loco et periodo assignato nomine, proferatur. Sit, *e. g.* numerus propositus 73·480·195. Notis in periodos distinctis, primum quæro quinam sint valores figuræ ad sinistram primæ; quæ, quoniam collocatur in secundo loco tertiæ

periodi, valet septem decadas millionum: quia vero numeri ratione decupla progrediuntur, intellecto notæ primæ valore, cæterarum valores ordine sequuntur. Sic ergo enunciabimus numerum propositum; septem decades et tres unitates millionum, quatuor centuriæ et octo decades millium, una centuria, novem decades et quinque unitates; vel contractius, septuaginta tres milliones, quadringenta octaginta millia, centum nonaginta quinque. Hinc cernimus quod cyfra, licet per se nil valeat, necessario tamen scribatur, ut unicuique notæ debitum assignemus locum.

Facillimum erit numeros quantumvis magnos scribere et enunciare, modo quæ dicta sunt perpendantur, quorum etiam scientia in sequentibus maximi erit momenti: siquidem qua ratione operationes arithmeticæ in digitis perficiantur ipsa docet natura; arte vero opus est ad easdem in numeris grandioribus accurate exercendas, quæ sane omnis in eo versatur, ut quod opus simul et uno quasi ictu peragi non sinit humanæ mentis angustia, id in plures partiamur opellas sigillatim inquirentes digitorum aggregata, differentias, producta, &c. dein hæc ita componamus ut exhibeant summam, residuum, aut productum, &c. totale; cujus rei ratio omnis et artificium petitur ex simplici locorum progressione, et in ea ultimo fundatur.

N.B. Non me latet arithmeticos nonnullos numerorum seriem aliter ac a nobis factum est partiri; sc. in senarios (composita denominatione) loco ternionum. Cum vero methodum quam tradimus sequantur etiam[2] alii, visum est et nobis eam (utpote simpliciorem) retinere.

[2] [v. g. Cl. Wallisius in *Mathes. Univers.*, et le Père Lamy dans ses *Elémens des Matéhmatiques.*]—Author. Wallis' *Mathesis Universalis* is the first article in his *Opera Mathematica* (Oxford, 1695). See ch. V, 'Numerorum Procreatio,' for the opinion to which Berkeley refers. Bernard Lamy (or Lami), priest of the Oratory, a Cartesian, was author of various works in mathematics and theology. One of these, *Traité de la Grandeur en général, qui comprend l'Arithmétique, l'Algèbre, l'Analyse*, &c., was published at Paris in 1680. The second edition of this book appeared in 1691, under the title *Elémens des Mathématiques.*

CAP. II.

DE ADDITIONE.

ADDITIONE quæritur duorum pluriumve numerorum aggregatum; quod ut obtineatur, numeri aggregandi sub invicem scribantur ea lege, ut unitates unitatibus, decades decadibus, partes decimæ decimis, &c. respondeant. Quamobrem, ubi adnexæ fuerint partes decimales, oportet unitatis locum adjecto commate insignire. Deinde, sumpto a dextris initio, notæ in primo loco occurrentes una addantur; decades autem siquæ proveniant, adjectis punctulis notatæ sequenti loco annumerandæ sunt, cujus itidem numeris (reservatis interim decadibus, quæ ad locum sequentem pertinent) in unam summam aggregati infra scribantur. Atque ita porro.

E. g. In primo, infra-scriptorum exemplo, 9 et 5 faciunt 14; decadem punctatam servo, cum 4 progredior; 4 et 8 sunt 12, punctata igitur decade, 2 subscribo; ad secundum locum accedens, reperio 6, quibus addo 2, *scil.* decadas in primo punctatas, 8 et 2 faciunt decadem, quam notatam servans, quæ sola superest 1 subscribo. Et sic deinceps.

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Quod si proponantur colligendæ res diversarum specierum, simili prorsus methodo operandum, dummodo habeatur ratio proportionis, juxta quam progrediuntur diversa rerum genera. *E. g.* Quoniam Lib. Sol. et Den. non ratione decupla ut numeri progrediuntur; adeoque non 10 denarii sed 12 constituant solidum; non 10 solidi sed 20, libram. Propterea in hisce speciebus addendis, loco decadis, numerus quilibet in denariis, duodenarius, in solidis, vicenarius, sequenti loco adscribendus est.

CAP. III.

DE SUBDUCTIONE.

SUBDUCTIONE quæritur duorum numerorum differentia, sive quodnam superfuerit residuum sublato uno ex altero; cujus obtinendi causa, numeri minoris nota quælibet notæ majoris ejusdem loci subscribatur; deinde subducendi prima dextrorsum nota ex nota suprascripta auferatur, residuumque infra notetur; atque ita porro, usque dum perficiatur subductio totius.

Si vero accidat numerum aliquem minorem esse quam ut ex eo nota subscripta auferri possit, is decade augeatur, mutuata scil. unitate a loco sequente.

Detur 1189 subtrahendus ex 32034. Numeris ut in exemplo subjecto scriptis, aggredior subductionem notæ primæ 9 ex supraposita 4; verum cum 4 ne semel quidem contineat 9, adjecta decade, fiat 14; ex 14 subductis 9, restant 5. Dein versus sinistram pergens, reperio 8, a 2 (loco 3, habita nimirum ratione mutuatæ decadis) subducenda, quod quoniam fieri nequit, aufero 8 a 12, et restant 4. Proxima subducendi nota est 1, quæ quia a nihilo, sive 0, non potest subtrahi, loco cyfræ 0, substituo 9, (9 inquam, quoniam, mutuata decas unitate numero præcedenti jam ante adjecta truncatur) ablata demum 1 ab 1, restat nihil. Porro peracta subductione restant 3, quæ itidem subscribo.

Haud dissimili ratione subductio specierum diversarum perficitur: modo advertamus non semper decadem, sed numerum qui dicit quotuplus locus quilibet sit præcedentis, in supplementum defectus notæ alicujus mutuandum esse.

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N.B. Ex dictis liquet arithmeticæ (quam hactenus tradidimus)

artificium consistere in perficiendo per partes id quod una vice fieri nequeat; rationem vero in additione, reservandi, in subductione, mutuandi decadas, a decupla locorum progressione omnino petendam esse.

CAP. IV.

DE MULTIPLICATIONE.

MULTIPLICATIONE toties ponitur multiplicandus quoties jubet multiplicans; seu quæritur numerus qui eandem habeat rationem ad multiplicandum, quam multiplicans ad unitatem. Numerus autem iste appellatur productum sive rectangulum; cujus latera seu factores dicuntur uterque tum multiplicandus, tum numerus per quem multiplicatur.

Ut productum duorum numerorum inveniamus, scripto numero multiplicante sub multiplicando, hic multiplicetur per quamlibet notam illius, incipiendo a dextris; cujusque autem producti nota prima directe subscribatur notæ multiplicanti, reliquæ versus lævam ordine sequantur.

Peracta multiplicatione, producta particularia in unam colligantur summam, ut habeatur productum totale, in quo tot loci partibus sunt assignandi, quot sunt in utroque factore.

Proponatur 30,94 ducendus in (sive multiplicandus per) 26,5. Quinquies 4 dant 20, cujus primam figuram 0 subscribo notæ multiplicanti (5), reliquam 2 servo; porro 5 in 9 dant 45; 5 cum 2 servatis faciunt 7, quæ subscribo, 4 sequenti loco ponenda servans; et sic deinceps.

	30,94 26,5	52886 24	6000 56
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Quoniam numeri cujusque duplex est valor, ut multiplicatio recte instituatur oportet utriusque rationem haberi; adeo ut nota quævis multiplicetur juxta valorem cum simplicem tum localem figuræ multiplicantis. Hinc nota prima cujusque particularis producti scribitur sub nota multiplicante. *E.g.* in secundi exempli multiplicatore, nota 2 valet duas (non unitates sed) decadas; ergo in 6 (primam multiplicandi notam) ducta producet duodecim (non quidem unitates, verum) decadas. Proinde primam producti notam in loco decadum *h.e.* directe sub nota multiplicante 2, poni oportet.

Ob eandem rationem, ubi in factoribus occurrunt partes, numerus ex prima multiplicandi nota in primam multiplicantis ducta genitus, tot locis detrudendus est infra notam multiplicatam, quot multiplicans dextrorsum ab unitate distat; adeoque tot loci in producto totali partibus seponendi sunt, quot fuerant in utroque factore.

N.B. Si factori utrique aut alterutri a dextris accedant cyfræ non interruptæ, multiplicatione in reliquis notis instituta omittantur istæ mox producto totali adjiciendæ: quippe cum loci proportione decupla progrediantur liquet numerum decuplum, centuplum, millecuplum, &c. suiipsius evadere, si modo uno, duobus aut tribus locis promoveatur.

CAP. V.

DE DIVISIONE.

Divisio opponitur multiplicationi; nempe productum quod hæc conficit, illa sibi dissolvendum sive dividendum proponit. Numerus in divisione inventus, dicitur *Quotiens:* siquidem dicit quoties dividendus continet divisorem vel (quod idem est) rationem dividendi ad divisorem; seu denique, partem dividendi a divisore denominatam.

In divisione, scriptis dividendo et divisore, sicut in exemplorum subjectorum primo, captoque initio a sinistris, pars dividendi divisori æqualis, vel eum proxime superans (intelligo valorem tantum simplicem) interposito puncto seponatur. Quærendum dein quoties divisor in membro isto contineatur, numerusque proveniens erit

prima quotientis nota; porro divisor ducatur in notam inventam, productoque a membro dividendo ablato, residuum infra notetur, cui adscripta sequente dividendi nota, confit novum membrum dividendum, unde eruatur nota secunda quotientis, mox in divisorem ducenda, ut producto ex membro proxime diviso ablato, residuum una cum sequente dividendi nota, præbeat novum membrum; atque ita porro, usque dum absoluta fuerit operatio. Subductis demum locis decimalibus divisoris ab iis qui sunt in dividendo, residuum indicabit quot loci partibus assignandi sunt in quotiente; quod si nequeat fieri subductio, adjiciantur dividendo tot cyfræ decimales quot opus est.

Peracta divisione, si quid superfuerit, adjectis cyfris decimalibus continuari poterit divisio, donec vel nihil restet, vel id tam exiguum sit, ut tuto negligi possit; aut etiam quotienti apponantur notæ residuæ subscripto iisdem divisore.

Si uterque, dividendus nempe et divisor, desinat in cyfras, hæ æquali numero utrinque rescindantur; si vero divisor solus cyfris terminetur, eæ omnes inter operandum negligantur, totidemque postremæ dividendi notæ abscissæ, sub finem operationis restituantur, scripto infra lineolam divisore.

Proponatur 45832, dividendus per 67. Quoniam divisor major est quam 45, adjecta nota sequente fiat 458, membrum primo dividendum; hoc interposito puncto a reliquis dividendi notis secerno. 6 in 45 continetur septies, et superest 3; veruntamen quoniam 7 non itidem septies in 28 reperitur, ideo minuendus est quotiens. Sumatur 6; 6 in 45 invenitur sexies, atque insuper 9, quin et 98 continet 7 sexies, est igitur 6 nota prima quotientis. Hæc in divisorem ducta procreat subducendum 402, quo sublato a 458, restant 56; his adscribo 3, proximam dividendi notam, unde confit novum membrum, nimirum 563, quod sicuti prius dividens, invenio 8 pro nota secunda quotientis: 8 in 67 dat 536, hunc subduco a membro 563, residuoque 27 adjiciens reliquam dividendi notam, *viz.* 2, habeo 272 pro novo dividendo, quod divisum dat 4, qua primo in quotiente scripta, dein in divisorem ducta, productoque ex 272 ablato, restant 4 quotienti, scripto infra lineolam divisore, adjicienda.

Expeditior est operatio, ubi subductio cujusque notæ multiplicationem immediate sequitur; ipsa autem multiplicatio a sinistra dextrorsum instituitur. *E. g.* Sit 12199980 dividendus per 156

(*vide* exempl. 3) sub 1219 primo dividendi membro scripto divisore, constat hunc in illo septies contineri; quamobrem 7 scribo in quotiente. Septies 1 est 7, quibus subductis ex 12, deleo tum notam multiplicatam 1 tum 12 partem membri unde auferebatur productum, residuum 5 supra notans; dein accedo ad proximam divisoris notam 5; 7 in 5 dat 35; 35 ex 51 ablatis, restant 16, quæ supra scribo, deletis 51 et 5. Deinde autem 7 in 6 duco, productoque 42 ex 69 subtracto, supersunt 27, quæ proinde noto, deletis interim tum 69 tum 6, ultima dividendi figura. Porro divisorem jam integre deletum, denuo versus dextram uno loco promotum scribo, perque illum membrum suprascriptum (quod quidem fit ex residuo membri proxime divisi sequente nota aucto) quemadmodum præcedens divido. Eodem modo divisor usque promoveatur quoad dividendum totum percurrerit.[3]

67)458.32(684$\frac{4}{67}$	200)8200	4r
402		r2 3 2
	2) 82 (41	567r73
563	8	r2r9998o(78205
536		r566666
	02	r5555
272	2	rrr
268		
	00	
004		

Jam vero præceptorum ratio dabitur; et primum quidem liquet, cur quotientem per partes investigemus.

2. Quæri potest, cur *v. g.* in exemplo supra allato habeatur 6 pro quotiente membri primi per divisorem divisi, nam 67 in 458 centuriis (pro centuriis nimirum habendæ sunt cum duobus locis sinistrorsum ab unitate distent) non sexies, sed sexcenties continetur? Respondeo, revera non simpliciter 6, sed 600 scribi in quotiente; duæ enim notæ postmodum inventæ istam sequuntur, atque ita quidem quotienti debitus semper conservatur valor; nam unicuique notæ tot loci in quotiente, quot membro unde eruebatur in dividendo postponuntur.

[3] This method of performing Division the old Italians rejoiced in, under the name of *galea*, from its shape, dear to a native of the Lagune.

3. Quandoquidem nota quælibet quotientis indicat quoties id, ex quo eruebatur, dividendi membrum divisorem contineat æquum est ut ex divisore, in notam proxime inventam ducto, confletur subducendum: tunc nempe aufertur divisor toties ad amussim quoties in dividendo continetur, nisi forsan æquo major aut minor sit numerus ultimo in quotiente scriptus. De illo quidem errore constabit, si productum tam magnum fuerit, ut subduci nequeat; de hoc, si e contra productum oriatur tam exiguum ut peracta subductione residuum divisore majus sit vel ei æquale.

4. Ratio cur tot loci partibus seponantur in quotiente, quot cum iis qui sunt in divisore æquentur locis decimalibus dividendi, ex eo cernitur, quod numerus dividendus sit productum, cujus factores sunt divisor et quotus, adeoque ille tot habeat locos decimales quot hi ambo, id quod demonstravimus de multiplicatione agentes.

5. Patet cyfras decimales ad calcem dividendi adjectas ipsius valorem non immutare. Nam integros quod attinet, ii dummodo eodem intervallo supra unitates ascendant, eundem sortiuntur valorem; decimales vero non nisi præpositis cyfris in inferiorem gradum deprimuntur.

6. Quoniam quotiens exponit seu denominat rationem dividendi ad divisorem, patet proportione illa sive ratione existente eadem, eundem fore quotientem; sed abjectis cyfris communibus, ratio seu numerorum ad invicem habitudo minime mutatur. Sic *v. g.* 200 est ad 100, vel (quod idem est) 200 toties continet 100, quoties 2 continet 1, quod sane per se manifestum est.

CAP. VI.

DE COMPOSITIONE ET RESOLUTIONE QUADRATI.

Productum ex numero in seipsum ducto, dicitur numerus *quadratus*. Numerus autem ex cujus multiplicatione oritur quadratus, nuncupatur *latus* sive *radix quadrata*; et operatio qua numeri propositi radicem investigamus, dicitur *extractio radicis quadratæ*, cujus intelligendæ causa juvabit genesin ipsius quadrati, partesque ex quibus componitur, earumque ordinem situmque contemplari. Veruntamen quoniam in inquirenda rerum cognitione consultius

est a simplicissimis et facillimis ordiri, a contemplatione geneseos quadrati, ex radice binomia oriundi, initium capiamus.

Attentius itaque intuendum est, quid fiat ubi numerus duabus notis constans in seipsum ducatur. Et primo quidem manifestum est, primam a dextra radicis notam in notam supra positam, seipsam nempe, duci; unde oritur quadratum minoris membri. Deinde vero, eadem nota in sequentem multiplicandi, *i. e.* alteram radicis notam ducta, provenire rectangulum ab utroque radicis membro conflatum constat. Porro peracta multiplicatione totius multiplicandi per primam radicis notam, ad secundam accedimus, qua in primam multiplicandi notam ducta, oritur jam denuo rectangulum duarum radicis binomiæ notarum; deinde secunda multiplicandi nota, *i. e.* eadem per eandem, multiplicata, dat secundi membri radicis binomiæ quadratum.

Hinc ergo colligimus, quadratum quodvis a radice binomia procreatum constare primo ex quadrato membri minoris; secundo duplici rectangulo membrorum; tertio quadrato membri majoris.

Proponatur radix binomia, *v. g.* 23 quadranda, juxta ea quæ cap. 4. traduntur; primo duco 3 in 3, unde producitur 9, quadratum membri minoris. Secundo duco 3 in 2, alteram radicis notam; prodit 6, rectangulum utriusque notæ. Tertio, ex 2 in 3 ducto oritur jam secunda vice rectangulum membrorum. Quarto, 2 in 2 gignit 4, quadratum membri majoris.

23
23

69
46

Progrediamur ad genesin quadrati a radice trimembri. Atque hic, primo quidem, prima radicis nota in integram radicem ducta procreat, primo, primi membri quadratum; secundo, rectangulum membrorum primi ac secundi; tertio, rectangulum membrorum primi ac tertii. Secundo, secunda radicis nota multiplicans radicem dat, primo, rectangulum membrorum primi ac secundi; secundo, quadratum membri secundi; tertio, rectangulum membrorum secundi ac tertii. Tertio, ex tertia radicis nota in radicem ducta oritur, primo, rectangulum membrorum secundi ac tertii; secundo, rectangulum membrorum secundi ac tertii; tertio, quadratum tertii membri radicis.

Hinc porro colligimus quadratum quodvis a radice trinomia genitum complecti, primo, quadratum notæ radicis primæ; secundo, duplex rectangulum notæ primæ in duas reliquas ductæ; tertio, quadratum duarum reliquarum, *i. e.* bina singularum quadrata et

earundem duplex rectangulum, quæ quidem constituere quadratum duarum notarum jam ante ostendimus.

Simili methodo ostendi potest quadratum 4, 5, quotlibet notarum continere, primo quadratum notæ infimæ; secundo, duplex rectangulum ex infima in sequentes omnes ducta genitum; tertio, quadratum notarum omnium sequentium; quod ipsum (uti ex præmissis manifestum est) continet quadratum notæ a dextris secundæ, duplex rectangulum ejusdem in omnes sequentes ductæ, quadratum notarum omnium sequentium; quod pariter continet quadratum notæ tertiæ, bina rectangula illius et sequentium harumque quadratum, atque ita porro, usque quoad ventum sit ad quadratum altissimæ radicis notæ.

Inventis tandem partibus ex quibus componitur quadratum, restat ut circa earum ordinem situmque dispiciamus. Si itaque quadratum incipiendo a dextris in biniones partiamur, ex genesi quam supra tradidimus constabit, primum (a sinistris) membrum occupari a quadrato notæ primæ sive altissimæ, simul ac ab ea duplicis rectanguli ex notis prima et secunda in invicem ductis conflati portione, quæ extra primum sequentis binionis locum redundat: secundi locum primum continere dictum duplex rectangulum, atque insuper quicquid quadrati notæ secundæ, excurrat; secundum capere quadratum notæ secundæ, et quod redundat duplicis rectanguli duarum priorum notarum in tertiam ductarum (quoad notam infimam) ad locum primum tertii binionis pertinentis, et sic deinceps; *v. g.* in exemplo apposito, membrum primum 10 continet 9 quadratum notæ primæ 3, simul ac 1 qua 12 (duplex rectangulum notæ 3 in sequentem 2 ductæ) locum primum secundi membri transcendit. Primus locus secundi binionis capit 2 (duplicis rectanguli notarum 3 et 2 reliquum), atque etiam id quod extra locum proxime sequentem redundat, &c.

321
321
321
642
963
10·30·41

Perspecta jam compositione quadrati, ad ejusdem analysin accedamus. Proponatur itaque numerus quivis (*e. g.* 103041), unde elicienda sit radix quadrata. Hunc incipiens a dextris, in biniones (si par sit locorum numerus, alioqui membrum ultimum ex unica constabit nota) distinguo. Quæro dein quadratum maximum in (10) membro versus lævam primo contentum, cujus radix (3) est nota prima radicis indagandæ, ipsum autem quad-

```
 103041(321
   9
 ------
6)13·0
  124
 ------
64)641
 ------
   641
  ------
   000
```

ratum (9) a membro (10) subduco. Ex residuo (1) adjecta (3) nota prima sequentis membri confit dividendus (13), quem divido per notam inventam duplicatam (*i. e.* 6), quotiens (2) erit nota radicalis secunda; qua primo in divisorem, deinde in seipsam ducta, productisque in unam summam collectis, ita tamen ut posterius uno loco dextrorsum promoveatur (*e. g.*[12] 4) habeo numerum subducendum (124), hunc aufero ex dividendo (13) aucto (0) nota reliqua secundi membri: residuo (6) adjicio (4) notam primam tertii binionis, ut fiat novus dividendus (64), qui divisus per (64) duplum radicis hactenus inventæ dat (1) notam tertiam radicis indagandæ; hac tum in divisorem tum in seipsam ducta, factisque ut supra simul aggregatis, summam (641) subduco a dividendo (64) aucto accessione notæ alterius membri tertii: eadem plane methodo pergendum quantumvis producatur operatio.

Si quid post ultimam subductionem superfuerit, id tibi indicio sit, numerum propositum non fuisse quadratum; verumtamen adjectis resolvendo cyfris decimalibus operatio extendi poterit quousque lubet.

Numerus locorum decimalium, si qui fuerint, in resolvendo bipartitus indicabit, quot ponendi sunt in radice. Cujus ratio cernitur ex cap. 4.

Ratio operandi abunde patet ex præmissis. Nam *e. g.* adhibui (6) duplum notæ inventæ pro divisore, propterea quod ex tradita quadrati compositione, duplex rectangulum notæ illius (3) in sequentem (2) ductæ dividendum complecti rescissem, eoque adeo diviso per duplum factoris unius (3) confactorem ejus (2) *h. e.* notam proximam radicis innotescere. Similiter, subducendum conflavi ex duplici rectangulo quotientis et divisoris, simul ac quotientis quadrato in unum, ea qua dictum est ratione, collectis; quia bina illa rectangula et quadratum eo ordine in residuo et membro sequente, ex quibus fiebat subductio, contineri deprehenderam, atque ita quidem potestatis resolutio ex ipsius compositione facili admodum negotio deducitur.

CAP. VII.

DE COMPOSITIONE ET RESOLUTIONE CUBI.

Radix in quadratum ducta procreat cubum. Ut sternamus viam ad analysin cubi, a compositione potestatis (quemadmodum in capite præcedenti factum) sumendum est initium. In productione igitur cubi a radice binomia primum radicis membrum offendit, primo, suiipsius quadratum, unde cubus notæ primæ; secundo, duplex rectangulum membrorum, unde duplex solidum quadrati notæ primæ in alteram ducti; tertio, quadratum membri alterius, unde solidum ex nota prima et quadrato secundæ genitum. Similiter, facta multiplicatione per membrum secundum, oritur primo, solidum notæ secundæ et quadrati primæ; secundo, duplex solidum notæ primæ et quadrati secundæ; tertio, cubus membri secundi.

Continet ergo cubus a radice binomia procreatus singulorum membrorum cubos et 6 solida, nimirum 3 facta ex quadrato membri utriusvis in alterum ducto.

Hinc ratiocinio ad analogiam capitis præcedentis protracto, constabit, si (ut quadratum in biniones, ita) cubus a quantavis radice genitus, in terniones distribuatur, ternionem seu membrum a sinistris primum continere cubum notæ sinistrorsum primæ, simul ac redundantiam (si quæ sit) 3 solidorum quadrati ejusdem in secundam ducti; locum primum secundi capere dicta solida et redundantiam 3 solidorum quadrati notæ secundæ in primam, locum secundum eadem 3 solida et redundantiam cubi notæ secundæ; tertium occupari a dicto cubo, simul ac redundantia 3 solidorum, ex quadrato notarum præcedentium in tertiam ducto genitorum: locum primum tertii membri solida ultimo memorata obtinere, et sic deinceps. Hinc facile derivabimus methodum eliciendæ radicis cubicæ, quæ est ut sequitur.

Incipiendo a dextris, resolvendum (80621568) in terniones (præter membrum postremum quod minus esse potest) punctis interpositis distribuo. Dein cubum maximum (64) in (80) primo versus sinistram membro contentum subduco, scriptaque illius radice (4) in notam primam radicis quæsitæ, residuo (16) abscribo (6) notam proximam resolvendi, unde confit dividendum (166)

quod divido per (48) triplum quadrati notæ inventæ: quotiens (3) est nota secunda radicis: hanc duco, primo in divisorem; secundo, ipsius quadratum in triplum notæ primæ; postremo, ipsam in seipsam bis. Producta ea lege aggregata, ut secundum a primo, tertium a secundo, uno loco dextrorsum ponatur, $\left\{\begin{array}{r} 144 \\ 108 \\ 27 \end{array}\right\}$ subduco a dividendo aucto accessione duarum notarum reliquarum membri secundi. Ad eundem modum, utut prolixa sit operatio, numerum dividendum semper præstat residuum, adjuncta prima sequentis membri nota: divisorem vero, triplum quadrati notarum radicis hactenus inventarum: et subducendum, nota ultimo reperta in divisorem ducta, ejusdem quadratum in triplum notarum præcedentium: postremo illius cubus, ea qua diximus ratione aggregati constituent.

```
   80·621.568(432
   64
  ---------
 48)166.21
     15507
5547)1114568
     1114568
     --------
     0000000
```

Si numerus resolvendus non sit cubus, quod superest, adjectis locis decimalibus, in infinitum exhauriri potest.

Radici assignanda est pars tertia locorum decimalium resolvendi.

N. B. Operationes syntheticæ examinari possunt per analyticas, et vicissim analyticæ per syntheticas: adeoque si numero alterutro ex summa duorum subducto, restet alter, recte peracta est additio; et vice versa, extra dubium ponitur subductio, quoties aggregatum subducti et residui æquatur numero majori dato. Similiter, si quotiens in divisorem, aut radix in seipsam ducta procreet dividendum, aut resolvendum, id tibi indicio sit, in divisionem aut resolutionem nullum repsisse vitium.

ARITHMETICÆ

PARS SECUNDA.

CAP. I.

QUID SINT FRACTIONES?

Scripto divisore infra dividendum, ductaque linea intermedia, divisionem utcunque designari, jam ante[4] monuimus. Hujusmodi autem quotientes dicuntur numeri fracti seu *fractiones*, propterea quod numerus superior, qui dicitur etiam numerator, dividitur seu frangitur in partes ab inferiore denominatas, qui proinde dicitur denominator: *e. g.* in hac fractione $\frac{2}{4}$ 2 est dividendus seu numerator, 4 divisor seu denominator; ipsa autem fractio indicat quotientem qui oritur ex divisis 2 per 4, *h. e.* quadrantem duarum rerum quarumvis, vel duos quadrantes unius; nempe idem sonant.

N. B. Patet numeros qui partes decimales denotant, quique vulgo fractiones decimales audiunt, subscripto nominatore, per modum fractionum vulgarium exprimi posse. *E. g.* ,25 valent $\frac{25}{100}$; ,004 valent $\frac{4}{1000}$ &c. id quod faciamus oportet, aut saltem factum intelligamus, quotiescunque eæ in fractiones vulgares aut vicissim hæ in illas reducendæ sint, aut aliam quamvis operationem, utrosque fractos, vulgares et decimales ex æquo respicientem, fieri contingat.

[4] [Cap. v. p. 1.]—Author.

CAP. II.

DE ADDITIONE ET SUBDUCTIONE FRACTIONUM.

1. Si fractiones, quarum summa aut differentia quæritur, eundem habent nominatorem, sumatur summa aut differentia numeratorum, cui subscriptus communis nominator quæsitum dabit.

2. Si non sunt ejusdem nominis, ad idem reducantur. Nominatores dati in se invicem ducti dabunt novum nominatorem; cujusque autem fractionis numerator, in nominatores reliquarum ductus, dabit numeratorem novæ fractionis datæ æqualis. Dein cum novis fractionibus operandum ut supra.

3. Si integer fractioni addendus sit, aut ab ea subducendus, vel vice versa, is ad fractionem datæ cognominem reducatur; nempe illi in nominatorem datum ducto idem nominator subscribendus est.

Additio	$\frac{1}{5}$ ad $\frac{2}{5}$ sum. $\frac{3}{5}$
Subductio	$\frac{1}{5}$ a $\frac{2}{5}$ resid. $\frac{1}{5}$
Additio	$\frac{2}{3}$ ad $\frac{3}{4}$, *i. e.* $\frac{8}{12}$ ad $\frac{9}{12}$ sum. $\frac{17}{12}$
Subductio	$\frac{2}{3}$ a $\frac{3}{4}$, *i. e.* $\frac{8}{12}$ ex $\frac{9}{12}$ resid. $\frac{1}{12}$
Additio	3 ad $\frac{5}{8}$, *i. e.* $\frac{24}{8}$ ad $\frac{5}{8}$ sum. $\frac{29}{8}$
Subductio	$\frac{5}{8}$ ex. 3 *i. e.* $\frac{24}{8}$ resid. $\frac{19}{8}$

Primo, Dicendum est, cur fractiones, antequam operemur, ad idem nomen reducamus: atque id quidem propterea fit, quod numeri res heterogeneas numerantes in unum colligi, aut ab invicem subduci nequeant. *E. g.* Si velim addere tres denarios duobus

solidis, summa non erit 5 sol. aut 5 den. neque enim illa prius haberi potest quam res numeratas ad idem genus reducam, adhibendo loco duorum solidorum 24 denarios, quibus si addam 3 den. oritur aggregatum 27 den. pari ratione 2 partes tertias et 3 quartas una colligens, non scribo 5 partes, tertias aut quartas; sed earum loco usurpo 8 duodecimas et 9 duodecimas, quarum summa est 17 duodecimæ.

Secundo, Ostendam quod fractiones post reductionem idem valeant ac prius, *e. g.* quod $\frac{2}{3}$ æquentur $\frac{8}{12}$: siquidem uterque nominator et numerator per eundem numerum (*v. g.* 4) multiplicantur; omnis autem fractio exprimit rationem numeratoris, seu dividendi, ad nominatorem, seu divisorem; proinde dummodo ratio illa eadem manet, fractio eundem retinet valorem; sed ducto utroque rationis termino in unum eundemque numerum, certum est rationem non mutari: *e. g.* si dimidium rei cujusvis sit dimidii alterius rei duplum, erit et totum illud totius hujus duplum; quod quidem tam liquido patet, ut demonstratione non indigeat.

Tertio, Integer ad fractionem reductus non mutat valorem: nam si 2 numerorum rectangulum per unum eorundem dividatur, quotiens erit alter; sed in reductione integri ad fractum is in nominatorem datum ducitur, et per eundem dividitur: igitur quotiens, *h. e.* fractio valet integrum primo datum.

N.B. Utile nonnunquam erit, fractionem ad datum nomen reducere; *e. g.* $\frac{2}{6}$ ad alteram, cujus nominator sit 9: quod quidem fit per regulam trium (de qua vide par. 3. cap. 1.) inveniendo numerum, ad quem nominator datus ita se habeat ac fractionis datæ nominator ad ejusdem numeratorem; is erit numerator fracti cujus datum est nomen, valor autem idem qui prioris; quippe inter fractionis terminos eadem est utrobique ratio.

CAP. III.

DE MULTIPLICATIONE FRACTIONUM.

1. Si ducenda sit fractio in fractionem, datarum fractionum numeratores in se invicem ducti, dabunt numeratorem producti; dati item nominatores procreabunt ejusdem nominatorem.

2. Si multiplicanda sit fractio per integrum, ducatur integer datus in numeratorem fractionis, eodem manente nominatore.

3. Si in factore alterutro, vel utroque occurrant integri, aut fractiones heterogeneæ, ei claritatis causa una colligi poterunt.

EXEMPLA MULTIPLICATIONIS.

Multiplic.	$\frac{2}{3}$ per $\frac{5}{8}$ pro. $\frac{10}{24}$	$\frac{4}{7}$ per 2 prod. $\frac{8}{7}$
Multiplic.	2 & $\frac{3}{5}$ per $\frac{1}{2}$ & $\frac{2}{3}$ *i.e.* $\frac{13}{5}$ per $\frac{7}{6}$	

Manifestum est quotientem eadem proportione augeri, qua dividendum: *E.g.* si 2 continetur ter in 6, continebitur bis ter in bis 6; liquet insuper eundem eadem proportione minui, qua crescit divisor. *E.g.* si numerus 3 continetur quater in 12, continebitur bis 3 duntaxat bis in 12: igitur cum ut multiplicem $\frac{2}{3}$ per $\frac{5}{8}$, augenda sit fractio $\frac{2}{3}$ ratione quintupla, quoniam per 5, et minuenda ratione octupla, quoniam non simpliciter per 5, sed solummodo ejus partem octavam multiplicatur; duco dividendum 2 in 5, et divisorem 3 in 8.

2. Quod ad regulam secundam, constat bis 4 res quasvis æquari 8 rebus ejusdem denominationis, quæcunque demum sit illa.

CAP. IV.

DE DIVISIONE FRACTIONUM.

1. Fractio per integrum dividitur, ducendo integrum datum in nominatorem fractionis datæ.

2. Si fractio per fractionem dividenda sit, numerator divisoris ductus in nominatorem dividendi dabit nominatorem quotientis; et ejusdem nominator ductus in numeratorem dividendi dabit numeratorem quotientis.

3. Quotiescunque admiscentur integri aut fractiones diversi nominis, facilius operabere si membra utriusque, tum dividendi tum divisoris, in binas summas colligantur.

EXEMPLA DIVISIONIS.

Div. | $\frac{3}{4}$ per 2, quot. $\frac{3}{8}$ |
Div. $\frac{4}{9}$ per $\frac{2}{5}$ quot. $\frac{20}{18}$
Div. $2\frac{1}{3}+\frac{3}{2}$ per $3\frac{2}{5}$, *i. e.* $\frac{23}{6}$ per $\frac{17}{5}$

1°. Quantum ad primam regulam, ex capite præcedenti constat, fractionem eadem proportione minui seu dividi, qua multiplicatur nominator.

2°. Postquam dividens fractionem unam per aliam, *e. g.* $\frac{4}{9}$ per $\frac{2}{5}$, duxi nominatorem 9 in 2, fractio $\frac{4}{18}$ dicit tantum quoties 2 continetur in dividendo; illius vero quintuplum indicabit quoties pars quinta numeri 2 ibidem continetur; quapropter quotientem primum $\frac{4}{18}$ duco in 5, inde fit $\frac{20}{18}$.

N.B. Si fractiones datæ sunt homogeneæ, brevius est et concinnius dividere numeratorem dividendi per numeratorem divisoris, quotiescunque illum hic metitur. Sic divisis $\frac{6}{8}$ per $\frac{3}{8}$ quotiens erit 2, quæcunque enim numerantur 6 bis continent 3.

2. Si extrahenda sit radix e fractione data, radix nominatoris radici numeratoris subscripta constituet fractionem quæ erit radix quæsita. *E. g.* $\frac{2}{3}$ est radix quadrata fractionis $\frac{4}{9}$, et cubica fractionis $\frac{8}{27}$; nam ex iis quæ de multiplicatione diximus patet, $\frac{2}{3}$ in $\frac{2}{3}$ producere $\frac{4}{9}$ et $\frac{2}{3}$ in $\frac{4}{9}$ dare $\frac{8}{27}$.

CAP. V.

DE REDUCTIONE FRACTIONUM AD MINIMOS TERMINOS.

1. Quoniam fractionum quæ ex minimis terminis constant valor clarius agnoscitur, utile est fractionis terminos, quoties id fieri potest, per communem aliquam mensuram dividere. Quanto autem major fuerit communis iste divisor, tanto minores erunt quotientes seu termini fractionis datæ æqualis. Oportet itaque,

datis duobus numeris, intelligere methodum inveniendi maximam eorum communem mensuram, *i. e.* divisorem maximum qui datos dividat absque residuo. Qui est ut sequitur :

2. Divide majorem e datis per minorem, et divisorem per divisionis residuum, et si quod denuo supersit residuum, per illud residuum prius, *i. e.* ultimum divisorem dividas; atque ita porro, donec veneris ad divisorem qui dividendum suum exhauriat sive metiatur; is est maxima datorum communis mensura.

E. g. Proponantur 9 et 15. Divido 15 per 9, restant 6. Divido 9 per 6, restant 3: porro divisis 6 per 3, restat nihil. Ergo 3 est maxima communis mensura datorum numerorum 9 et 15: quod sic ostendo.

(*a*) 3 metitur 6, at (*b*) 6 metitur 9 demptis 3; igitur 3 metitur 9 demptis 3; sed 3 metitur seipsum, metitur ergo integrum 9: atqui (*c*) 9 metitur 15 demptis 6, ergo 3 metitur 15 demptis 6, metitur vero 6; igitur metitur integrum numerum 15. Hinc patet 3 esse propositorum 9 et 15 communem mensuram. Superest ut ostendam eandem esse maximam. Si negas, esto alia quæpiam major, puta 5; jam quoniam (*d*) 5 metitur 9, (*e*) 9 vero metitur 15 demptis 6, liquet 5 metiri 15 demptis 6; sed et integrum 15 (ex hypothesi) metitur, igitur metitur 6; 6 autem metitur 9 demptis 3, ergo 5 metitur 9 demptis 3. Quoniam igitur 5 metitur et integrum 9, et 9 demptis 3, metietur ipsum 3, *h. e.* (*f*) numerum minorem; quod est absurdum.

Inventa maxima communi mensura, patet fractionem $\frac{9}{15}$ deprimi posse ad hanc $\frac{3}{5}$, quam priori æqualem esse sic ostendo. Omnis fractio denotat quotientem numeratoris divisi per nominatorem; in divisione autem, quotiens dicit rationem dividendi ad divisorem, dum igitur ratio eadem manet, erit et quotiens seu fractio eadem. Porro rationem non mutari, terminis ejus pariter divisis, liquido constat; *e. g.* si res quælibet sit alterius rei dupla, vel tripla, erit et dimidium illius, dimidii hujus, duplum vel triplum, &c.

[[5]Qui fractiones per integros dividere et multiplicare novit, si in fractionibus (ut vocant) fractionum ad simplices reducendis

(*a*) per const. (*b*) per const. (*c*) per const. (*d*) per hyp. (*e*) per const. (*f*) per hyp.

[5] Not in the 1707 edition.

nullam difficultatem experietur. Nam *v. g.* hæc fractio fractionis $\frac{3}{4}$ de $\frac{2}{5}$ ecquid aliud est quam pars quarta fractionis $\frac{2}{5}$ triplicata, sive $\frac{2}{20}$ ducta in integrum 3? Similiter, ductis in invicem tam numeratoribus quam nominatoribus, fractio fractionis fractionis, &c. ad integrum reducitur. Hæc cum tam clara sint et per se manifesta, mirum profecto per quantas ambages, quam operosam theorematum citationem, et specierum supellectilem a nonnullis demonstrantur, dicam, an obscurantur?]

ARITHMETICÆ

PARS TERTIA.

CAP. I.

DE REGULA PROPORTIONIS.

Regula *proportionalis* dicitur, qua, datis quibus numeris, invenitur quartus proportionalis. Illius quidem usus frequens est et eximius: unde nuncupatur *regula aurea*. Dicitur etiam *regula trium*, ob 3 terminos datos. Porro quartum directe proportionalem invenies, multiplicando terminum secundum per tertium, et productum per primum dividendo: *E. g.* si ut 2 ad 6, ita se habeat 4 ad quæsitum, duc 4 in 6, et productum 24 divide per 2, quotiens 12 erit quartus proportionalis quæsitus. Quod sic demonstro:

In quatuor proportionalibus, productum extremorum æquatur producto terminorum intermediorum. Nam propterea quod numeri sint proportionales, *h. e.* eandem habeant inter se rationem, ratio vero per divisionem cognoscatur, diviso termino secundo per primum, et quarto per tertium, idem proveniet quotiens; qui (ex natura divisionis) ductus in terminum primum, producet secundum, et in tertium, producet quartum. Jam, si ducamus terminum primum in quartum, vel (quod idem est) in tertium et quotientem continue, et terminum tertium in secundum vel (quod idem est) in primum et quotientem continue, patet producta fore æqualia, nam iidem sunt utrobique factores. Sed ex natura multiplicationis et divisionis constat, diviso producto per unum

e factoribus, quotientem esse alterum. Igitur, si dividam productum duorum terminorum intermediorum (6 et 4) per primum (2), quotiens (12) exhibebit quartum proportionalem quæsitum.

Quæstio 1. Viator tribus horis conficit quindecim milliaria; quot conficiet novem horarum spatio? *Resp.* 45. Patet enim ex quæstione, ut 3 ad 15, ita 9 esse ad quæsitum: *i. e.* 3 : 15 : : 9: ergo 135, productum ex 9 in 15, divisum per 3, dabit quæsitum, *viz.* 45.

Quæst. 2. Si 2 operarii 4 diebus merentur 2*s.* 5 quantam mercedem merebuntur 7 diebus? *h. e.* ut 2 in 4 ad 2, ita 5 in 7 ad quæsitum: sive 8 : 2 : : 35? Unde invenitur quæsita merces, *viz.* 8*s.* 9*d.*

Quæst. 3. Tres mercatores, inita societate, lucrifaciunt 100*l.* expendebat autem primus 5*l.* secundus 8*l.* tertius 10*l.* Quæritur quantum lucri singulis seorsim contigit? summa impensarum est 23*l.* Dic itaque, ut 23 ad 5, ita 100 ad quæsitum: numerus proveniens indicabit quantum primo de communi lucro debetur; æquum nempe est, ut quam proportionem habet cujusque impensa ad summam impensarum, eandem habeat ipsius lucrum ad summam lucrorum. Porro ad eundem modum dicendo 23 : 8 : : 100? et 23 : 10 : : 100 : ? cæterorum lucra innotescent.

[[6]Proportio composita inversa in simplices facillime resolvitur.
lib. lib.
V. g. 2 homines expendunt, 5, 6 diebus: 30 quot diebus expendent 8 homines? Dic primo 2 : 5 : : 8? inveniens 20; dic igitur denuo 20 : 6 : 30 : ? et habebis quæsitum. Qua vero ratione terminus quæsitus simul et semel per regulam satis intricatam innotescat, explicare superfluum duco.]

Quæst. 4. Quatuor fistulæ implent cisternam 12 horis; quot horis implebitur illa, ab 8 ejusdem magnitudinis? Dicendum 8 : 4 : : 12? Proinde 4 in 12, *h. e.* 48, divisa per 8, exhibent quæsitum, *viz.* 6. Neque in hoc casu, ubi invertitur proportio ulla est nova difficultas; nam terminis rite dispositis, semper habebimus bina æqualia rectangula, quorum unius notum est utrumque latus, alterum vero conflatur ex noto termino in ignotum ducto: quare dividendo productum illud prius per notum latus, seu factorem hujus, proveniet terminus ignotus. Quo autem ordine disponendi sint termini, ex ipsa quæstione palam fiet.

[6] Not in the 1707 edition.

CAP. II.

DE ALLIGATIONE.

Regula *alligationis simplicis* dicitur, qua, propositis duabus rebus diversi pretii aut ponderis, &c. invenitur tertium quoddam genus, ex datis ita compositum, ut illius pretium vel pondus, &c. æquetur dato cuidam pretio vel ponderi, &c. inter proposita intermedio. *E. g.* Pollex cubicus auri pendit uncias (18), pollex cubicus argenti uncias (12). Quæritur pollex cubicus metalli cujusdam ex utroque mixti qui pendat 16 uncias; in quo problemate, pondus intermedium 16 superat argenti pondus per 4, et superatur ab auri pondere per 2. Jam, si capiamus $\frac{2}{6}$ cubi argentei, et $\frac{4}{6}$ cubi aurei, patet eas una conflatas dare pollicem cubicum; quippe $\frac{2}{6}$ et $\frac{4}{6}$ æquantur unitati. Quin patet etiam metalli hujusce mixti pondus æquari dato intermedio 16; nam argenti, quod levius est per 4, accepimus 2 partes; igitur defectus est 2 in 4; auri vero, quod gravius est per 2, accepimus 4 partes: adeoque excessus est 4 in 2, *i. e.* æqualis defectui; qui proinde se mutuo tollunt.

Hinc oritur regula pro alligatione rerum duarum: Fractio quæ nominatur a summa differentiarum, et numeratur a defectu minoris infra medium indicat quantitatem majoris sumendam; et vicissim quæ eundem habens nominatorem, numeratur ab excessu majoris supra medium, indicat quantitatem minoris sumendam.

Quæst. Sunt duo genera argenti, uncia purioris valet 7, vilioris 4, quæruntur 3 unciæ argenti, quæ valeant singulæ 5? Resol. constat ex regula, si accipiam $\frac{2}{3}$ unciæ vilioris, et $\frac{1}{3}$ unciæ purioris argenti, haberi unam unciam mixti quæsiti; hæc triplicata solvit quæstionem.

Quod si res alligandæ sint plures duabus, dicitur *alligatio composita*. *E. g.* sunt quinque vini genera, vis massici est 1, chii 3, falerni 5, cæcubi 7, corcyræi 9: volo mixtum cujus vis sit 4. Mixti æqualiter ex chio et massico, vis erit 2: nimirum dimidium summæ datarum 1 et 3, uti per se patet. Similiter, mixti æqualiter ex falerno cæcubo et corcyræo, vis erit 7, *i. e.* $\frac{1}{3}$ numeri 21, seu summæ virium misturam hancce componentium. 2 et 7 alligo cum vi intermedia data, *viz.* 4, defectus est 2, excessus 3, summa

differentiarum 5: igitur sumendæ sunt $\frac{3}{5}$ misturæ prioris, $\frac{2}{5}$ posterioris; porro divisis $\frac{3}{5}$ per 2, quotiens indicat quantum singulorum, chii et massici, accipiendum sit. Similiter $\frac{2}{5}$ divisæ per 3 dicent quantum falerni, &c. mixturæ quæsitæ inesse debet. Proinde $\frac{3}{10}$ massici, $\frac{3}{10}$ chii, $\frac{2}{15}$ falerni, $\frac{2}{15}$ cæcubi, $\frac{2}{15}$ corcyræi dabunt quæsitum.

Hinc cernimus, quomodo alligatio composita ad simplicem reducatur. Nimirum pondera, pretia, magnitudines, aut quæcunque demum sunt alliganda, in binas colligantur summas, quæ dividendæ sunt, utraque, per numerum terminorum qui ipsam constituunt: quotientes juxta regulam alligationis simplicis alligentur cum termino intermedio: quæ proveniunt fractiones, divisæ, singulæ per numerum rerum, mixturam sive summam ad quam spectant ingredientium, indigitabunt quantitatem ex singulis capiendam. Demonstratio patet ex dictis.

N. B. In alligatione plurium rerum quæstio quævis innumeras admittit solutiones, idque ob duplicem rationem: nam primo termini deficientes cum excedentibus diversimode colligi possunt; unde varii prodibunt quotientes, cum dato termino intermedio alligandi. Cavendum tamen est ne dicti quotientes sint simul majores, aut simul minores medio; quod si eveniat, patet quæsitum esse impossibile. Secundo, unum eundemque terminum licet sæpius repetere; unde illius portio augebitur, reliquorum vero portiones minuentur.

Libet in studiosorum gratiam hic exhibere solutionem celebris illius problematis, ad Archimedem ab Hierone propositi.

Quæst. Ex conflatis auro et argento fit corona: quæritur quantum ei insit auri, quantum argenti? coronam interim violari non sinit tyrannus. Respon. Parentur binæ massæ, una auri, altera argenti, quarum utraque sit ejusdem ponderis ac corona. Quibus paratis, patet problema, alia forma, sic proponi posse: datis *v. g.* libra auri, et libra argenti, invenire libram metalli ex utroque compositi, quæ sit datæ intermediæ molis: igitur inquirendæ sunt massarum et coronæ magnitudines. Quoniam vero coronæ soliditas geometrice determinari nequeat, opus est stratagemate. Singulæ ergo vasi aqua pleno seorsim immergantur; mensuretur autem quantitas aquæ ad cujusque immersionem profluentis quam immersæ moli magnitudine æqualem esse constat: immerso uti-

que auro, aqua exundans sit 5, argento 9, corona 6. Huc igitur redit quæstio; datis libra auri cujus magnitudo est 5, et libra argenti cujus magnitudo est 9, quæritur quantum ex singulis capere oporteat, ut habeamus libram metalli cujus magnitudo sit 6: proinde alligatis 9 et 5 cum magnitudine intermedia 6, innotescet quantitas auri, *viz.* $\frac{3}{4}$ lib. et $\frac{1}{4}$ lib. quantitas argenti, coronæ immisti.

Hinc patet, quam non difficile sit problema, ob cujus solutionem notum illud εὕρηκα ingeminavit olim Archimedes.

CAP. III.

DE PROGRESSIONE ARITHMETICA ET GEOMETRICA, ET DE LOGARITHMIS.

Progressio *Arithmetica* dicitur series numerorum, eadem communi differentia crescentium vel decrescentium. *E. g.* In hac serie 1. 4. 7. 10. 13. 16. 19. 22. 25, 3 est communis excessus, quo terminus secundus excedit primum, tertius secundum, quartus tertium, et sic deinceps: et in hac altera decrescentium serie, 15. 13. 11. 9. 7. 5. 3. 1, 2 est communis defectus, quo terminus quilibet a præcedenti deficit.

Jam ex ipso serierum harumce intuitu et quam præmisimus definitione, manifestum est, unumquemque terminum continere minorem extremum, simul ac communem differentiam, multiplicatam per numerum locorum quibus ab eodem distat. *E. g.* In prima serie terminus quintus 13 constat ex minore extremo 1, et communi differentia 3, ducta in 4, *i. e.* numerum locorum quibus a minimo extremo distat. Hinc dato minore extremo, et communi differentia, terminus quivis, *e. g.* a minimo undecimus exclusive, facile inveniri potest, ducendo differentiam 3 in 11, et productum 33 minori extremo 1 addendo. Idem invenitur, datis majore extremo, differentia communi, et numero locorum quibus terminus quæsitus a maximo sejungitur, ducendo communem differentiam in numerum locorum datum, et productum e majore extremo auferendo. Patet etiam qua ratione datis termino quolibet, ejusdem indice, et communi differentia, terminus primus

assignetur; et quomodo ex datis termino quovis, illius indice, et minore extremo, communis differentia itemque ex datis termino, differentia, et minore extremo, termini index eruatur. Quin et illud etiam patet, *viz.* dimidium summæ duorum terminorum æquari medio proportionali arithmetico. *E. g.* 7 et 13 faciunt 20, cujus dimidium 10 est terminus inter datos medius (*vide seriem primam*). Hæc et alia bene multa theoremata ac problemata, eorumque solutiones, ex ipsa progressionis arithmeticæ natura facile quisquam deduxerit, præsertim si logistica speciosa utatur. Quapropter ea exercitii causa tyronibus relinquo.

Progressio Geometrica vocatur series numerorum, eadem continua ratione crescentium vel decrescentium. *E. g.* 3. 6. 12. 24. 48. 96. sunt in progressione geometrica, cujus ratio communis est dupla, nimirum terminus quisque duplus est præcedentis. Similiter numeri hujus decrescentis seriei, 81. 27. 9. 3. 1. progrediuntur ratione subtripla, *i. e.* terminus quilibet præcedentis subtriplus est sive $\frac{1}{3}$.

Ubi observandum est, terminum quemvis conflari ex potestate communis rationis, ipsi cognomine, in terminum primum ducta. *E. g.* In serie prima, 48, terminus exclusive quartus, producitur ex 16, potestate quarta numeri 2 (*i. e.* quæ generatur ex 2 ter in seipsum ducto, siquidem ipsa radix dicitur potestas prima) per terminum primum 3 multiplicata. Quamobrem ea quæ de progressione arithmetica diximus etiam hic locum habent, si pro additione et subductione multiplicationem et divisionem, pro multiplicatione et divisione involutionem et evolutionem, sive radicum[7] extractionem adhibeamus. *E. g.* Quemadmodum in progressione arithmetica summa extremorum bisecta dat medium arithmeticum, ita in progressione geometrica medius proportionalis est radix producti extremorum. Adeoque theoremata et problemata quod spectat, iis, cum illa ex nuda serierum contemplatione facillime eruantur, ulterius deducendis non immorabimur.

At vero unum est progressionis geometricæ theorema, ex quo olim derivata fuit, et etiamnum dependet nobilis logarithmorum scientia, quodque adeo hic visum est explicare.

In progressione geometrica cujus principium est unitas, rectan-

[7] [N. B. Quomodo potestatum quarumvis radices extrahantur, lector diligens, juxta methodum quam secuti sumus de quadrato et cubo eorumque radicibus agentes, investigare poterit.]—Author.

gulum duorum quorumlibet terminorum æquatur termino ejusdem progressionis, qui pro indice habet summam indicum factorum. *E. g.* Si sequentis seriei $\begin{cases} 1. & 2. & 4. & 8. & 16. & 32. & 64. \\ 0. & 1. & 2. & 3. & 4. & 5. & 6. \end{cases}$ ducamus terminum secundum 2 in quartum 8, productum 16 est terminus quintus, cujus index 4 æquatur indicibus secundi et quarti una collectis.

Ratio manifesta est: nam quælibet potestas, in aliam quamcunque ejusdem radicis ducta, procreat tertiam, cujus dimensiones tot sunt, quot fuere in utraque potestate generante. Sed in progressione geometrica, cujus terminus primus sit unitas, patet reliquos omnes subsequentes esse potestates ex communi ratione genitas, quarum singulæ tot habeant dimensiones, quot locis ab unitate distant.

Igitur si infinitæ progressioni geometricæ adscriberetur indicum series itidem infinita, ad obtinendum duorum terminorum rectangulum haud necesse foret unum per alterum multiplicare; oporteret solummodo, indicibus una collectis, quærere indicem qui aggregato æquetur, is sibi adscriptum ostenderet rectangulum quæsitum. Similiter, si dividendus sit unus terminus per alium, differentia indicum, si extrahenda sit radix quadrata aut cubica, $\frac{1}{2}$ aut $\frac{1}{3}$ indicis, quæsitum quotum, vel radicem, indigitaret.

Hinc patet, difficiliores arithmeticæ operationes insigni compendio exerceri posse, si conderentur tabulæ, in quibus numeri naturali ordine collocati habeant singuli indicem a latere respondentem: tunc quippe multiplicatio, sola additione; divisio, subductione; extractio radicum, bisectione vel trisectione indicum, peragerentur. Sed indices illos, sive logarithmos, numeris accommodare, *hoc opus, hic labor est;* in quo exantlando plurimi desudarunt mathematici.

Primi[8] quidem tabularum conditores hac fere methodo usi sunt. Numeris 1. 10. 100. 1000, &c. in progressione decupla existentibus, logarithmos assignarunt 0.0000000. 1.0000000. 2.0000000. 3.0000000, &c. Deinde ut numeri alicujus, *v. g.* 4, inter 1 et 10 intermedii, logarithmum invenirent, adjectis utrique septem cyfris, inter 1.0000000, et 10.0000000, medium proportionalem quæsiere; qui si minor esset quam 4, inter ipsum et 10.0000000, si vero major, inter eum et 1.0000000, medius proportionalis indagandus erat: porro inter hunc (si minor esset quam 4) et prox-

[8] Not Napier. He took fourth proportionals, not mean.

ime majorem, sin major, et proxime minorem, denuo quærebant medium proportionalem; et sic deinceps, usque dum ventum fuisset ad numerum, non nisi insensibili particula, puta $\frac{1}{10000000}$, a proposito 4 differentem. Hujus autem logarithmus obtinebatur, inveniendo medium arithmeticum inter logarithmos numerorum 1 et 10, et alium inter ipsum et logarithmum denarii, &c. Jam si bipartiatur logarithmus numeri 4, habebitur logarithmus binarii, idem duplicatus dat logarithmum numeri 16; et si logarithmo quaternionis addatur logarithmus binarii, summa erit logarithmus octonarii. Simili methodo, ex uno logarithmo numerii 4 alii innumeri inveniri possunt.

Ad eundem modum, cum cæteris numeris inter unitatem et decadem intermediis aptati essent logarithmi, alios quamplurimos eorum summæ, differentiæ, &c. suppeditarunt. Sed de his satis; neque enim omnia quæ ad logarithmos spectant tradere statuimus: id duntaxat propositum fuit, eorum naturam, usum, et inventionem quadantenus exponere.

MISCELLANEA MATHEMATICA:

SIVE

COGITATA NONNULLA

DE

RADICIBUS SURDIS, DE ÆSTU AERIS, DE CONO ÆQUILATERO
ET CYLINDRO EIDEM SPHÆRÆ CIRCUMSCRIPTIS,
DE LUDO ALGEBRAICO;

ET

PARÆNETICA QUÆDAM AD STUDIUM MATHESEOS,
PRÆSERTIM ALGEBRÆ.

AUTORE * * * * ART. BAC. TRIN. COL. DUB.

1707.

EGREGIO ADOLESCENTI

D. SAMUELI MOLYNEUX[1],

IN ACADEMIA DUBLINIENSI SOCIORUM COMMENSALI, FILIO VIRI CLARISSIMI GULIELMI MOLYNEUX[1], PAUCIS AB HINC ANNIS ACERBO, TAM PATRIÆ QUAM REI LITERARI, FATO DENATI.

EGREGIE ADOLESCENS,

TANTA fuit patris tui, dum viveret, apud eruditos existimatio, ut me rem iis pergratam facturum arbitrer, si filium, sui acuminis ac solertiæ hæredem, ipsum reliquisse palam faciam. Fatendum quidem est, patruum tuum, virum doctrina juxta ac humanitate insigni, tale aliquid jam pridem[2] fecisse. Viderat nimirum vir clarissimus, eam esse tui necdum adolescentis indolem, ut te olim paterna pressurum vestigia verisimile judicaret. Cujus tanti viri auctoritas apud me usque eo valuit, ut deinceps magnam de te spem conceperim. Nunc autem, cum ipse studiorum tuorum conscius, te saniori philosophiæ et mathesi operam

[1] Samuel Molyneux, to whom the *Miscellanea Mathematica* are addressed, was the son of William Molyneux (the friend and correspondent of Locke), by whom the *Essay on Human Understanding* was introduced into Trinity College soon after its first publication. Cf. *New Theory of Vision*, 'Editor's Preface,' and sect. 132. The younger Molyneux was born in 1689, at Chester, where his family had retreated for a time from the tyranny of Lord Tyrconnel's government. He was trained by his father with great care, according to the method of Locke's tract on *Education*, and afterwards, when his father died (in October, 1698), by his uncle Dr. Thomas Molyneux. Samuel Molyneux was Berkeley's pupil at Trinity College, Dublin. In the early part of his public life he was secretary at Hanover to the Prince of Wales, afterwards George II. He introduced his former tutor to the Prince and Princess, which was the first occasion of Berkeley's being known to Queen Caroline. Mr. Molyneux lived much at Kew. He devoted himself to optics and astronomy, from which pursuits an appointment in the Admiralty in a great measure withdrew him. He died in 1728. The interesting correspondence of the elder Molyneux and also of the uncle with Locke, from July 1692 till January 1699, should be studied in connection with the introduction of the Lockian and Newtonian philosophy into Dublin. (See Locke's *Works*, vol. IX. pp. 289-472.)

[2] [Vide epistolam Thomæ Molyneux, M.D. ad Episcopum Clogherensem. *Philosoph. Transact.* No. 282.]—AUTHOR. Thomas Molyneux, younger brother of William, was Professor of Medicine in the University of Dublin, and Physician-General to the Army. He attained high repute, and was made a baronet in 1730. He died in 1733. He was F.R.S., and contributed many Essays to the Transactions.

strenue navantem cernam; quum spinas quibus obsepta videtur mathesis, quæque alios quamplurimos ab ejus studio deterrere solent, te e contra ad alacrius pergendum stimulare; quum denique ad industriam illam et sciendi ardorem præclaram ingenii vim sentiam accedere; exundantem nequeo cohibere lætitiam quin in orbem literatum effluat, teque ex præcipuis (si modo Deus vitam largiatur et salutem) ineuntis sæculi ornamentis fore, certissimo sane augurio prænuntiem. Proinde, sequentibus quantuliscunque ad te delatis, ansam hancce tecum publice colloquendi arripere gestiebam; cum ut ipse proprio cedam affectui, tum ut tu, expectatione de te coorta, tanquam vinculo quodam, alioqui non ingrato, illi rerum pulcherrimarum studio devinciare.

MISCELLANEA MATHEMATICA[1].

DE RADICIBUS SURDIS[2].

Id mihi olim in mentem venit, ut putarem praxin algebraicam factum iri nonnihil faciliorem, si ablegato signo radicali, alia quæpiam excogitaretur potestatum imperfectarum radices computandi methodus, quæ ab usitata in reliquis operationum forma minus abhorreret. Nimirum, quemadmodum in arithmetica longe facilius tractantur fractiones a vulgaribus ad decimales reductæ, quia tunc notæ cujusque loco nominatoris vicem obeunte, altera sui parte truncantur, similique forma ac integri descriptæ, eandemque cum iis seriem constituentes, iisdem itidem legibus subjiciuntur; sic si ex logistica etiam speciosa ablegaretur nota ista radicalis [$\surd$] quæ, ut nominator inter fractiones et integros, operationum diversitatem inter radices surdas ac rationales inducit, praxis proculdubio minus intricata evaderet.

Quidni itaque radices quascunque surdas, perinde ac rationales, per nudas duntaxat literas designemus, *v. g.* pro $\surd b$ substituto *c* vel *d*? Quippe surdis ad hunc modum designatis, nihil intererit inter eas ac potestatum perfectarum radices; additio, subductio, multiplicatio, &c. ad eundem modum utrobique peragentur. Sed

[1] These 'Mathematical Miscellanies,' published along with the 'Arithmetic' in 1707, contain some ingenious operations and applications in Algebra, as well as a speculation on the cause of the Atmospheric Tide. They conclude with an ardent persuasive to the study of Mathematics, especially Algebra, to which Berkeley was then enthusiastically devoted. He adduces (pp. 61–2) Sir William Temple, Bacon, Des Cartes, Malebranche, and Locke as authorities in favour of Mathematics, in particular Algebra, as a mental discipline; and he ends by lamenting that other studies, dry and jejune enough, were at that stage in his lifetime superseding charming Mathematics, to which he hoped soon to return. It seems that the diversion of his attention lasted long. Cf. *Analyst*, sect. 50, published nearly thirty years after, when he next appeared in mathematical literature, and with a different purpose.

[2] This essay on Surds does not carry much weight. The suggestion with which it commences has not met with favour, and is apt to produce confusion.

objicere in promptu est, vel magis quam signum radicale, species hac ratione multiplicatas calculum divexare. Siquidem cum nulla sit affinitas seu connexio inter b et c, adeoque una ex altera agnosci nequeat, videtur illius radix aptius designari per $\surd b$, cujus statim ac cernitur innotescit significatio. *Respondeo*, huic malo mederi posse, si *v. g.* Græcum alphabetum ad designandas radices introducamus, scribendo β pro $\surd b$, δ pro $\surd d$, &c. Quo pacto non tam ipsæ literæ quam characteres variabuntur, et nota quævis substituta in tantum referet primitivam, ut scrupulo non sit locus.

Quantitatis ex aliarum multiplicatione aut divisione conflatæ radix designabitur per earundem radices similiter multiplicatas seu divisas. *E. g.* $\surd bc = \beta\kappa$, et $\surd\frac{bdm}{e} = \frac{\beta\delta\mu}{\epsilon}$.

Si vero proponatur quantitas multinomia, seu constans ex pluribus membris (in quibus nulla sit quantitas ignota) signis + aut — inter se connexis; designetur horum aggregatum (quod et alias quidem sæpe fit) per unicam aliquam literam. *E. g.* fiat $a + b - c = g$ cujus radix est γ.

Quæris autem quid fiat ubi ignotæ quantitates notis connectantur; sit *v. g.* potestas imperfecta $f + x$: nam si utamur ϕ et ξ partium nempe potestatis radicibus, ex iis nequit determinari radix totius? Quidni igitur exæquemus potestatem datam imperfectam alteri cuidam perfectæ, *viz.* $f + x = ff + 2f\xi + \xi\xi$, vel $fff + 3ff\xi + 3f\xi\xi + \xi\xi\xi$, &c.? Tunc enim erit $f + \xi = \sqrt[2]{f + x}$ vel $\sqrt[3]{f + x}$, &c.

Sed illud prætermissum est, qua ratione radicis genus dignoscatur; utrum scilicet sit quadratica, aut cubica, aut biquadratica. Num itaque quadraticis linquendi sunt characteres Græci, reliquisque deinceps alii itidem assignandi? An potius manente eodem charactere, puncto supra notato radicem quadratam, binis cubicam, tribus biquadraticam, atque ita porro indigitemus: *e. g.* $\dot{a}$ significet radicem quadraticam quantitatis per a designatæ, $\ddot{a}$ radicem cubicum, $\dot{\dot{a}}$ biquadraticam, &c.? quo quidem modo fluxiones primæ, secundæ, tertiæ, &c. designantur. Seu denique id satis ducamus quod per retrogressum innotescat radicis denominatio? Quippe inter operandum nihil interest cujus generis sit radix aliqua, quandoquidem omnes absque signo radicali notatæ, iisdem subsint legibus, et ad eundem modum tractentur.

Cruda quidem sunt hæc et imperfecta, quamque nullius sint pretii ut a me proponuntur, sat cerno. Tu autem, *clarissime adolescens*, cui nec otium deest nec ingenium, ex hocce sterquilinio boni aliquid fortasse extraxeris. Cæterum haud scio, an ea quæ disseruimus tyronibus (reliquos ista flocci facturos scio) quadantenus usui esse possint; eorumque ope disquisitionis analyticæ filum nonnunquam enodetur eliminatis, cum ipso signo radicali, operationibus quæ illud comitantur heterogeneis. Utut id sit, mihi visus sum iis ex parte adhibitis, vulgarem *de surdis* doctrinam, brevius et clarius quam ab ullo quod sciam factum est, posse explicare. Proinde rem ipsam aggredior.

Radices surdæ dicuntur esse commensurabiles, cum earum ad invicem ratio per numeros rationales exprimi possit; quod si fieri nequeat, incommensurabiles appellantur. Porro si propositis duabus radicibus surdis, quærere oporteat, utrum sint commensurabiles necne; inveniatur exponens rationis existentis inter potestates quibus præfigitur signum radicale: hic si sit potestas perfecta, habens eundem indicem ac radices propositæ, erunt illæ commensurabiles: sin minus, incommensurabiles censendæ sunt. *E. g.* Sint radices propositæ $\sqrt[2]{24}$ et $\sqrt[2]{54}$. $\frac{4}{9}$ fractio quadrata exponit rationem potestatis unius 24 ad alteram 54; adeoque radices sunt commensurabiles, *viz.* $\sqrt[3]{24}$: $\sqrt[3]{54}$: : 2 : 3. Proponatur denuo $\sqrt[3]{320}$ et $\sqrt[3]{135}$: ratio numeri 320 ad 135 exponitur per $\frac{64}{27}$, cubum nempe perfectum, cujus radix $\frac{4}{3}$ indicat rationem radicis unius $\sqrt[3]{320}$ ad reliquam $\sqrt[3]{125}$. Demonstratio manifesta est, siquidem norunt omnes radices quadratas esse in ratione subduplicata, cubica in subtriplicata, biquadraticas in subquadruplicata, et sic deinceps potestatum respectivarum.

Quod si radices sint heterogeneæ quarum exploranda est ratio, ad idem genus reducantur, involvendo numeros signo radicali affixos, singulos juxta indicem radicis alterius; quibus sic involutis præfigenda erit nota radicalis cum indice ex indicibus primo datis in se mutuo ductis conflato. *E. g.* Sint radices surdæ heterogeneæ $\sqrt[2]{5}$ et $\sqrt[3]{11}$. Cubatis 5, et quadratis 11, proveniunt 125 et 121 : his præfixum signum radicale cum indice 6 præstat radices homogeneas $\sqrt[6]{125}$ et $\sqrt[6]{121}$. Hujus operationis ut cernatur ratio, designemus $\sqrt[2]{5}$ per speciem quamvis simplicem, puta b, et $\sqrt[3]{11}$ per c; eritque $\sqrt[2]{bb} = \sqrt[2]{5}$, et $\sqrt[3]{ccc} = \sqrt[3]{11}$,

et $\sqrt[6]{bbbbbb} = \sqrt[6]{125}$, et $\sqrt[6]{cccccc} = \sqrt[6]{121}$. Ubi porro patet quod $\sqrt[6]{bbbbbb} = \sqrt[2]{bb}$ et $\sqrt[6]{cccccc} = \sqrt[3]{ccc}$.

Additionem quod attinet radicum surdarum, illa, si sint commensurabiles, fit præfigendo summam terminorum rationis signo radicali, cui suffigendus est communis divisor cujus ope dictæ rationis termini innotuerunt. *E. g.* $\sqrt[2]{24} + \sqrt[2]{54} = 5\sqrt[2]{6}$. Nam ex antedictis, et iis quæ sequuntur de multiplicatione, $\sqrt[2]{24} = 2\sqrt[2]{6}$, et $\sqrt[2]{54} = 3\sqrt[2]{6}$. Ad eundem modum fit subductio, nisi quod differentia terminorum exponentis signo radicali præfigatur. Si addendæ sunt aut subducendæ radices surdæ incommensurabiles, mediantibus signis + aut − connectantur. *E. g.* $\sqrt{6} + \sqrt{3}$ et $\sqrt{6} - \sqrt{3}$ sunt summa et differentia radicum numerorum 6 et 3; quo quidem modo surdis adduntur aut subducuntur etiam numeri rationales.

Si radix surda per aliam homogeneam multiplicanda sit; rectangulo potestatum præponatur nota radicalis, simulque index communis. *E. g.* $\sqrt[2]{3} \times \sqrt[2]{7} = \sqrt[2]{21}$ et $\sqrt[3]{g} \times \sqrt[3]{x} = \sqrt[3]{gx}$. Ad cujus praxeos demonstrationem, designentur radices numerorum 3 et 7 per b et d, ut sit $bb = 3$ et $dd = 7$, et liquido constabit, quod $\sqrt[2]{bb\ dd} = bd$, i. e. radix quadrata producti æquatur producto radicum quadratarum. Idem ad eundem modum ostendi potest de aliis quibuscunque radicibus, cubicis, biquadraticis, &c. Radices heterogeneæ, priusquam multiplicentur, ad homogeneas reducendæ sunt. Si numerus rationalis in surdum ducendus sit, elevetur ille ad potestatem datæ imperfectæ cognominem, cui præfigatur nota radicalis, unaque ejusdem potestatis index. Cætera ut prius. *E. g.* $5 \times \sqrt[3]{4} = \sqrt[3]{125} \times \sqrt[3]{4} = \sqrt[3]{500}$. Vel brevius sic, $5\sqrt[3]{4}$; et generaliter $b \times \sqrt[a]{c} = \sqrt[a]{b^a c}$ vel $b\sqrt[a]{c}$.

Divisionem quod attinet, quoties dividendus et divisor sunt ambo radices surdæ, ablata (si qua sit) heterogeneitate, nota radicalis cum proprio indice quotienti potestatum præfixa, quotum quæsitum exhibebit. *E. g.* $\sqrt[2]{7} \div \sqrt[2]{3} = \sqrt[2]{\frac{7}{3}} = \sqrt[2]{2\frac{1}{3}}$. Si vero ex duobus alteruter duntaxat numerus seu species signo radicali afficitur; reliquus, juxta indicem radicis datæ involutus, notæ radicali suffigatur: deinde ut prius. *E. g.* $\sqrt[3]{96} \div 4 = \sqrt[3]{96} \div \sqrt[3]{64} = \sqrt[3]{\frac{96}{64}} = \sqrt[3]{\frac{3}{2}}$. Vel sine præparatione $\frac{\sqrt[3]{96}}{4}$. Et generaliter $\sqrt[a]{c} \div b = \sqrt[a]{\frac{c}{b^a}}$ vel $\frac{\sqrt[a]{c}}{b}$. Hæc, velut præcedentia, facillime demonstrantur.

DE ÆSTU AERIS[3].

Non ita pridem incidi in librum cui titulus, *De Imperio Solis et Lunæ in Corpora humana*, authore viro cl. M.D. et S.R.S[4]. Qui sane quantus sit, et quantulus sim ipse, non ignoro. Sed ut libere dicam quod sentio, sententiam ejus *De Æstu Aeris*, quam ibidem explicatam dat, utpote celeberrimi Newtoni principiis innixam, ambabus ulnis amplexus sum. Verumtamen haud scio, an author ingeniosus phænomenon quorundam isthuc pertinentium causas tam recte assecutus sit. Quam vero justa sit dubitandi ratio, tu, cujus perspectum habeo acumen, optime judicabis.

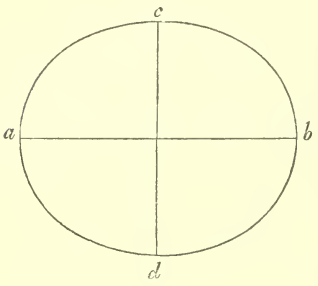
Tribuit vir cl. altiorem aeris circa æquinoctia tumorem figuræ sphæroidali terræ: differentiam insuper inter æris intumescentiam, quæ a luna meridionali, et illam quæ a luna (ut ita loquar) antimeridionali in sphæra obliqua excitatur, eidem causæ acceptam refert. Ego vero neutrius istorum phænomenon explicationem ab oblata sphæroide petendam duco. Propterea quod, primo, quamvis sententia quæ massam aereo-terrestrem ea esse figura contendit, rationibus tam physicis quam mathematicis comprobetur, et nonnullis item phænomenis pulchre respondeat; non tamen apud omnes usque adeo obtinet, ut nulli veteris, vel etiam oppositæ sententiæ fautores, iique non minimæ notæ viri, hodie reperiantur. Et sane memini, D. Chardellou, astronomiæ peritissimum, abhinc plus minus sesquianno, mihi indicasse, sibi ex observationibus astronomicis axem terræ diametro æquatoris compertum esse longiorem: adeoque terram esse quidem sphæroidem, sed qualem vult Burnetius[5], ad polos assurgentem, prope

[3] This speculation on the 'Atmospheric Tide' exposes some absurd errors, but it is hard to see what its intrinsic value is. To the mathematician it seems to involve a deficient appreciation of what constitutes mathematical proof.

[4] The author here referred to was Dr. Richard Mead, born 1673, an eminent London physician, author of various works in medicine and natural philosophy, whose works passed through many editions. His book *De Imperio Solis et Lunæ* was first published in London in 1704, and editions afterwards appeared in Leyden, Naples, Amsterdam, and Frankfort. It was translated into English in 1708.

[5] This reference is to a curious book by Dr. Burnet—*Telluris Theoria Sacra: orbis nostri originem, et mutationes generales quas aut jam subit, aut olim subiturus est, complectens.* London, 1681. The opinion referred to is thus stated: 'Manifestum est partes polares altiores fuisse æquinoctialibus, sive remotiores a centro: unde aquæ ceciderunt versus polos, in medias terræ partes defluere deberunt, et totam fere telluris

æquatorem vero humiliorem. Attamen quod ad me attinet, mallem quidem viri clarissimi observationes potius in dubium vocare, quam argumentis quæ terram esse oblatam demonstrant obviam ire. Nihilominus, quoniam sententia ista non omnibus æque arridet, illam tanquam principium ad phænomenon ullum explicandum adhiberi nollem, nisi res aliter commode explicari nequeat. Sed secundo, tantum abest quod supradictorum effectuum explicatio sphæroidalem terræ figuram necessario poscat, ut vix ullam inde lucis particulam mutuari videatur: id quod, appositis quæ in hanc rem scribit vir clarissimus, ostendere conabor. "Altius (inquit) solito se attollit aer circa duo æquinoctia, quoniam cum æquinoctialis linea illi globi terrestris circulo adversa respondeat qui diametrum habet maximam, utrumque sidus dum in illa versatur terræ est vicinius." *De Imp. Sol. et Lun.* p. 9. Jam vero, utrum vicinior iste luminarium situs par sit attollendo aeri in cumulum solito sensibiliter altiorem, merito ambigi potest. Etenim tantilla est differentia inter axem transversum et conjugatum ellipseos, cujus volutione gignitur sphærois terrestris, ut illa ad sphæram quamproxime accedat. Verum ut accuratius rem prosequamur, designet *a c b d* sectionem per polos massæ aereo-terrestris, in qua sit *d c* axis *a b* diameter æquatoris. Jam inito calculo, deprehendi vim lunæ attractricem in *b* vel *a* non esse $\frac{1}{4000}$ sui parte fortiorem quam foret in *c* vel *d*, si illa polo alterutri directe immineret, et proinde differentiunculam istam effectui ulli sensibili edendo imparem omnino esse. Considerandum etiam, lunam ab æquatore nunquam tertia parte arcus *b d* distare, dictamque proinde quantulamcunque differentiam adhuc valde minuendam esse. Quod autem de luna diximus, id de sole, cum multis vicibus longius absit, adhuc magis constabit.



Verum quidem est D. Mead alias insuper causas æstus prope

superficiem irrigare.' (Lib. II. cap. 5.) Burnet wrote several tracts in defence of his theory. He also wrote *Remarks* on Locke's *Essay*, in a series of tracts (1697–1699), afterwards collected as a review of Locke.

æquinoctia altioris attulisse; viz. "agitationem fluidi sphæroidis in majori orbe se revolventis majorem, præterea vim centrifugam effectum habentem eo loci longe maximum[6]." Quod ad primam, etsi illa prima fronte nonnihil præ se ferre visa sit, fatendum tamen est, me non omnino percipere, quomodo aliquid inde ad distinctam rei propositæ explicationem faciens colligi possit. Quod ad secundam, constat sane vim centrifugam prope æquatorem esse longe maximam, et propterea massam aereo-terrestrem figuram oblatæ sphæroidis induisse: quid vero aliud hinc sequatur non intelligo.

Verum etiamsi concedamus aerem, propter causas a clarissimo viro allatas, circa æquinoctia ad æquatorem supra modum tumefieri; non tamen inde apparet, quamobrem apud nos, qui tam procul ab æquatore degimus, tum temporis altius solito attollatur: quinimo contrarium sequi videtur. Sequenti pagina sic scribit D. Mead. "Ut finem tandem faciam, in iisdem parallelis ubi lunæ declinatio est, illum cœli polum versus qui altissimus insurgit, validissima est attractio, cum illa ad ejus loci meridianum verticem accedit, minima vero, ubi pervenit ad meridianum loci oppositi; quod contra contingit in parallelis his adversis. Causa est in sphæroide terræ ætherisque figura." Ergo vero causam non esse in terræ et ambientis ætheris figura propterea puto, quod posita terra vel perfecte spherica, vel etiam oblonga, idem certe eveniret, uti infra patebit.

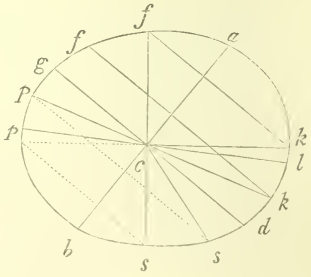
Restat ut harum rerum explicationem ipse aggrediar, siquidem eo præsertim nomine suspecta mihi fuit ratio a sphæroidali terræ figura deducta, quod, nulla ipsius habita ratione, res tota clarissime simul ac facillime exponi posse videbatur.

Newtonus, Operis sui Physico-Mathematici, lib. iii. prop. 24. ubi æstuum marinorum phenomena explicat, hæc habet: "Pendet etiam effectus utriusque luminaris ex ipsius declinatione seu distantia ab æquatore. Nam si luminare in polo constitueretur, traheret illud singulas aquæ partes constanter, absque actionis intensione et remissione, adeoque nullam motus reciprocationem cieret. Igitur luminaria recedendo ab æquatore polum versus effectus suos gradatim amittent, et propterea minores ciebunt

[6] *De Imperio Solis et Lunæ*, p. 7.

æstus in syzygiis solstitialibus quam in æquinoctialibus." Atqui non alia causa videtur quærenda ullius phænomeni æstus aerei, quam quæ ad similem effectum in æstu marino excitandum sufficiat. Sed ut id quod a viro per totum orbem longe celeberrimo breviter adeoque subobscure traditum est, uberius exponam; sit in priore figura *a d c b* meridianus, et *a b* axis massæ aereo-terrestris; sol autem et luna in polo constitui concipiantur. Manifestum est, quamvis massæ aereæ partem, puta *d*, durante circumvolutione diurna, eandem semper distantiam a luminaribus tueri, adeoque vi ubique æquali in eorum corpora trahi. Proinde aer non uno tempore attollitur, alio deprimitur, sed per totum diem in eadem hæret altitudine. Verum secundo, in eadem figura repræsentet *a c b d* æquatorem aut parallelum quemvis, luminaria interim in plano æquinoctiali existant; quo tempore manifestum est, tum ipsum æquatorem, tum singulos parallelos, ellipticam induere figuram. Manifestum etiam est, aerem qui nunc *a*, apicem axis transversi, obtinet, adeoque altissimus insurgit, post sex horas, *c*, extremum axis conjugati, ubi humillimus deprimetur, occupatum ire, maximamque proinde motus reciprocationem cieri. Ut igitur rem omnem simul absolvam, gibbos sphæroidis æstuosæ triplici ratione locari concipiamus; vel in polis, vel in æquatore, vel in locis intermediis. In primo casu, esset planum rotationis diurnæ ad axem sphæroidis perpendiculare, adeoque circulus; unde nullus foret æstus: in secundo, esset ad eundem parallelum, adeoque ellipsis, inter cujus axes maxima sit differentia; unde maximi forent æstus: in tertio, quo magis ad situm perpendicularem accederet, eo circulo vicinius esset, adeoque minores forent æstus.

Reliquum est ut demonstrem, differentiam quæ est in sphæra obliqua inter æstum quemvis et subsequentem, ubi luna extra æquatorem vagatur, terra posita vel oblata, vel ad amussim sphærica, vel etiam oblonga, perinde causatum iri. Sit *a b* axis mundi, *g d* æquator, *k* locus quivus, *f k* loci parallelus, *h l* axis sphæroidis æstuosæ ob actionem, potissimum, lunæ



utrinque tumentis. Luna autem prope *l* constituatur. Demonstrandum est *c k* altitudinum aeris, luna prope loci meridianum existente, majorem esse *c f*, aeris altitudine, ubi luna meridianum loci oppositi transierit. Ducatur *p s* parallelus priori ex adverso respondens, et producantur *c k*, *c f* ad *p* et *s*. Per constructionem arcus *p h* æqualis est arcui *k l*; ergo arcus *f h* major est arcu *k l*; ergo propter ellipsin recta *f s* minor est recta *k p*, et *f c* minor *k. c.* ☍. *e. d.*

DE CONO ÆQUILATERO ET CYLINDRO, EIDEM SPHÆRÆ CIRCUMSCRIPTIS[7].

LEMMA.

Latus trianguli æquilateri est ad diametrum inscripti circuli, ut $\sqrt{3}$ ad 1; et perpendicularis ex angulo quovis ad latus oppositum demissa, est ad eandem, ut 3 ad 2.

Hæc cuivis, algebram et geometriam utcunque callenti, facile constabunt.

PROBLEMA.

Invenire rationem quæ existit inter Cylindrum et Conum æquilaterum eidem Sphæræ circumscriptos.

Ponamus diametrum et peripheriam basis cylindri esse singulas unitatem. Eruntque, per Lemma, diameter basis coni ejusdemque peripheria singulæ $\sqrt{3}$. Proinde $1 \times \frac{1}{4} = \frac{1}{4}$ = bas. cylindri; et $\frac{1}{2}$ = summæ basium. Et $\sqrt{3} \times \frac{1}{4}\sqrt{3} = \frac{3}{4}$ = bas. coni, et superficies cylindri seu quadruplum baseos = 1. Et superficies simplex coni $= \frac{3}{2} = \frac{\sqrt{6}}{4} \times \sqrt{6}$. Nam $\sqrt{\frac{3}{2}}$ (*h. e.* media proportionalis inter $\sqrt{3}$ latus coni, et basis radium seu $\sqrt{\frac{3}{4}}$) est radius circuli æqualis superficiei conicæ. Et per præcedentia $1 + \frac{1}{2} = \frac{3}{2}$ = sup. tot. cylindri, et $\frac{3}{2} + \frac{3}{4} = \frac{9}{4}$ = sup. tot. coni. Porro per hypothesin

[7] This matter of the Cone is at best an ingenious conceit.

et lemma, axis cylindri est 1, et coni $\frac{3}{2}$. Soliditas autem cylindri $= \frac{1}{4} \times 1 = \frac{1}{4}$, et soliditas coni $= \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$. Hinc, comparatis inter se homogeneis, eruitur sequens

THEOREMA.

Inter Conum æquilaterum et Cylindrum eidem Sphæræ circumscriptos, eadem obtinet ratio sesquialtera, quoad superficies totas, superficies simplices, soliditates, altitudines, et bases.

Duobus abhinc annis[8] Theorema illud non sine admiratione aliqua inveni. Nec tamen propriam ingenii vim aut sagacitatem ullam, quippe in re tam facili, sed quod Tacquetus[9], notissimus matheseos Professor, tantopere gloriatus sit, de invento cui impar non sit tyro, id demum admiratus sum. Nempe is invenerat partem aliquam Theorematis præfati, *viz.* quod "conus æquilaterus sit cylindri, eidem sphæræ circumscripti, soliditate et superficie tota sesquialter; quodque adeo continuata esset ratio" inter conum æquilaterum, cylindrum, et sphæram. Hæc est ipsa illa propositio, ad quam spectat schema, quod præfati authoris tractatus *De Theorematis ex Archimede selectis*, in ipsa fronte, una cum epigraphe inscriptum præfert. Quin etiam videas quæ dicat Jesuita[10] in præfatione, in scholio ad prop. 32, et sub finem propositionis 44tæ ejusdem tractatus. Ubi Theorema hocce tanquam illustre aliquod inventum, et Archimedæorum æmulum ostentat. Idem quod Tacquetus, etiam Cl. Wallisius[11] in additionibus et emendationibus ad cap. lxxxi. algebræ suæ, a D. Caswello[12] ope Arithmetices Infinitorum demonstratum exhibet. Quod ipsum, quoad alteram ejus partem, facit D. Dechales[13] in libro suo de indivisibilium Methodo, prop. 20. Sed tam ipsa indivisibilium Methodus, quam quæ in ea fundatur Arithmetica infinitorum, a nonnullis minus Geometricæ censentur.

Integrum autem Theorema a nemine, quod sciam, antehac

[8] i. e. in 1705.

[9] Cf. p. 7.

[10] i. e. Tacquet.

[11] Wallis, the eminent mathematician and logician, died in 1703.

[12] John Caswell, an Oxford mathematician, author of *A Brief Account of the Doctrine of Trigonometry* (1689) and other works.

[13] Des Chales, a native of Chambery in Savoy, was professor of mathematics in Cleremont, and afterwards in Turin. His edition of Euclid was long a popular textbook. His works were published at Lyons, in four folios, under the title of *Mundus Mathematicus*. He died in 1678.

demonstratum fuit. Attamen si verum est quod opinatur Tacquetus: 'Idcirco Archimedi inter alia tam multa et præclara inventa, illud quo cylindrum inscriptæ sphæræ soliditate et superficie sesquialterum esse demonstrat, præ reliquis placuisse: quod corporum, et superficierum corpora ipsa continentium, eadem esset atque una rationalis proportio:' si, inquam, hoc in causa fuit, cur is cylindrum sphæræ circumscriptum tumulo insculptum voluit; quid tandem faceret senex ille Siculus, si unam eandemque rationalem proportionem bina corpora quintuplici respectu intercedere deprehendisset? Illud tamen quam facile ex ejus inventis profluat, modo vidimus.

[[14]Simili fere methodo ac nos illud omnia Tacqueti Theoremata Archimedæis subjuncta, adde et centum istiusmodi alia si cui operæ pretium videbitur, difficile erit invenire et demonstrare.]

DE LUDO ALGEBRAICO[15].

Sub idem tempus quo Theorema illud, Ludum etiam Algebraicum inveni. Quippe cum vidissem e familiaribus meis nonnullos, per dimidios ferme dies, Scacchorum[16] ludo gnaviter incumbentes, acre eorum studium in re nihili admiratus, rogavi quidnam esset quod tantopere laborarent? Illi porro pergratum animi exercitium renuntiant. Hoc ego mecum reputans, mirabar quamobrem tam pauci ad mathesin, utilissimam sane scientiam eandemque jucundissimam, animum applicarent. An quod difficilis sit? Sed multi et ingenio valent, nec laborem in nugis fastidiunt ullum. An potius, quod gratissimum animi exercitium non sit? Sed quænam, quæso, est illa ars, aut disciplina, aut quodcunque demum opus, quod omnem animi facultatem, solertiam, acumen, sagacitatem pulchrius exerceat? Sed ludus est mathesis? Nihilo secius jucunda: eo tamen si venisset nomine, tunc forsan lepidi isti

[14] Not contained in the 1707 edition.

[15] This curious Game, contrived as a substitute for Chess, and at the same time as a pleasing and useful exercise in Algebra, is very characteristic of Berkeley. Portions of what follows, especially the formulæ for the possible variations and combinations which the conditions of the Game admit of that are contained in the Appendix, are given in MS. in his Common-place-book. The Game itself is a sort of lottery—not to solve but to draw a set of simple equations. It is worth little, save as showing the bent of Berkeley's mind towards the practical side even of a game of chance. In reading it, he supposes himself, like a spider, in the centre of the *Tabula*.

[16] Chess.

homunciones, qui tempus ludendo terunt, ad ejus studium se protinus accingerent. Subiit adhæc sapientissimi viri Johannis Lockii[17], in re non multum absimili, consilium. Sequentem proinde lusum ad praxin algebræ exercendam, rudi fateor Minerva, excogitavi, sed qualis adolescenti, aliis præsertim studiis occupato, facile spero condonabitur.

Problemata algebraica immediate constituunt æquationes datæ, quæ in quæstionibus determinatis quantitates quæsitas numero exæquant. Quælibet autem æquatio duobus constat membris æqualitatis signo connexis, in quorum utroque considerandæ veniunt; primo, species, utrum scilicet quantitates datas aut quæsitas designent; deinde, signa quibus connectuntur. Efficere itaque ut hæc omnia ad constituendas quæstiones sorte obveniant, ludumque tam ex quæstionum formatione, quam ex earundem resolutione, concinnare operam damus.

In asserculo, qualis ad dominarum aut scacchorum lusum vulgo adhiberi solet, depingatur circulus quadrato inscriptus, reliquaque omnia quæ in apposito Schemate[18] continentur; nisi quod loco circellorum nigrantium facienda sint foramina. Quibus peractis, habebimus Tabulam lusoriam. Parandus insuper est stylus tenuis e ligno, qui alicui ex dictis foraminibus infigatur. Reliquum est ut horum usum exponamus.

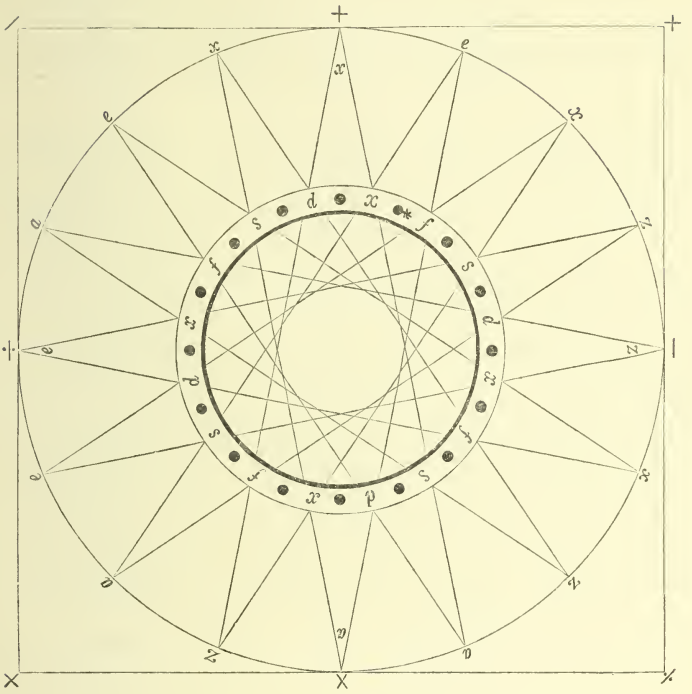
Ut vides, operationum logisticarum Symbola ad latera et angulos Quadrati scribuntur: porro latera prioribus, anguli vero posterioribus, æquationum membris signa impertiunt. Circulus autem inscriptus a sedecim cuspidibus in totidem partes æquales dispescitur, ita ut tres cuspides ad latus et angulum quemvis spectent, sed aliæ directe, aliæ oblique: quæ oblique latus aliquod aut angulum respiciunt, eæ angulo et lateri communes sunt; quæ vero directe latus aliquod intuentur, eæ ad angulum nullum pertinent, sed ad utrosque adjacentes pariter referuntur. Et vicissim quæ angulum aliquem directe intuentur, eæ ad latus nullum pertinent, sed ad utraque adjacentia pariter referri censendæ sunt.

In formanda itaque quæstione, primo observanda est cuspis quam stylus respicit, latusque et angulum ad quos pertineat; horum signa notentur, quippe quæ, ut diximus, species utriusque

[17] See *Essay on the Conduct of the Understanding*, § 7. This is the first allusion to Locke in Berkeley's works.

[18] In the original edition, the *Tabula Lusoria* occupies an enlarged page, which faces this section.

TABULA LUSORIA.



cujuslibet æquationis membri connectent. Dein, stylo literæ ad prædictam cuspidem scriptæ imposito, numera 1, eoque inde juxta rectæ lineæ ductum translato (ut faciunt astrologi, nominum quibus feriæ appellantur rationem assignantes) ad literam oppositam, numera 2. Tunc ad alteram lineæ, tanquam continuata esset per annulum intermedium extremitatem pergens, numera 3; et sic deinceps, donec litera primæ cuspidi adjacens recurrat. Hinc recta descendens ad cuspidem in convexitate interioris circuli terminatam, foramini alterutro adjacenti infige stylum.

Numerus ultimo numeratus indicabit, quot quantitates quæsitæ, vel (quod idem est) quot æquationes datæ fuerint in quæstione. Harum membra priora quantitates ignotæ alternatim sumptæ et signo laterali connexæ, posteriora quantitates cognitæ vel incognitæ (prout determinarit litera ad cuspidem internam scripta) quæsitis signo angulari alligatæ, constituent. Porro *d* adhibendas

quantitatum cognitarum species diversas, *s* unam solummodo, *f* figuras numerales 2, 3, 4, &c. *x* quantitates quæsitas repetendas esse indicat. Notandum autem, in cujusque æquationis membro posteriore non alias poni quantitates ignotas, quam quæ in primo membro sequentis æquationis reperiantur. Dicta exemplis clarescent.

Ponamus itaque stylum occupare foramen stellula insignitum, cuspisque quam respicit pertinebit ad latus cujus signum est +, et ad angulum cujus signum est ×, quæ signa in charta noto, laterale a sinistris sive primum deinde angulare. Porro *e* ad cuspidem scribitur, ad quam numero 1; inde (liberum autem est e duabus lineis utriusvis ductum sequi) sinistrorsum pergens offendo *a*, ad quam numero 2; hinc transiens ad *z* numero 3; inde autem transversim eunti denuo obversatur *e*, litera primæ cuspidi apposita, ad quam numerans 4, recta descendo ad cuspidem interiorem litera *d* insignitam. Erunt igitur quatuor quantitates quæsitæ in quæstione, quæ signo laterali +, alternatim connexæ, constituent prima æquationum datarum membra. Posteriora vero fient ex quantitatibus ignotis et notis (propter *d*) diversis per signum angulare, nimirum ×, conjunctis; ad hunc modum:

$a+e=yb$	$a=?$
$e+y=zc$	$e=?$
$y+z=ad$	$y=?$
$z+a=ef$	$z=?$

Quod si ponamus stylum foramini præcedenti infixum esse, quo pacto + laterale directe intuebitur, lineæque sinistræ ductum sequamur, provenient tres quantitates investigandæ, et cuspis interior habebit literam *f*. Unde numerus æquationum datarum et primorum earundem membrorum signa, itemque posteriorum species determinantur. Sed quoniam in hoc casu cuspis indifferenter se habet respectu duorum angulorum adjacentium, idcirco eorum signa per vices usurpanda sunt: secundum quas conditiones hujusmodi struatur quæstio.

$a+e=2y$	$a=?$
$e+y=3-a$	$e=?$
$y+a=4e$	$y=?$

Posito autem stylum sequenti foramini infigi, cuspis stylaris in × angulare dirigetur, signaque lateralia + et − pariter respiciet.

Proinde, si fert animus dextram inire semitam, juxta leges præmissas sequens prodibit quæstio:

$$a+e=ey \qquad a=?$$
$$e-y=ay \qquad e=?$$
$$y+a=ae \qquad y=?$$

[19] Notandum autem primo, quod varietatem aliquam in signorum et specierum combinationibus præscriptæ leges admittant. Unde fit, quod cuspide semitaque determinatis, diversæ oriantur quæstiones.

Secundo, quod etsi ad primæ literæ recursum sistendum esse supra statuimus, lex tamen illa pro cujusvis arbitrio mutari possit; ita ut progrediamur donec singulæ, *a*, *e*, *z*, *x*, obversentur, vel aliqua ex iis bis, vel ad aliam quamcunque metam. Sed ad lusum properamus.

Primum itaque e lusoribus aliquis ad methodum jam traditam quæstionem sibi formet. Quod et cæteris deinceps iisdem legibus faciendum est. Porro formatis singulorum quæstionibus, ad ejus quæ sorte obtigit solutionem se quisque accingat. Faciat dein unusquisque fractionem, cujus numerator sit numerus quantitatum in suo problemate quæsitarum, et nominator, numerus graduum sive æquationum quas, dum solveretur quæstio, chartis mandabat. Penes quem maxima sit fractio, is vincat.

Proinde, siquando fugitivæ quantitates inhiantem eluserint algebristam, is omni victoriæ spe excidisse censendus est. Neque id prorsus injuria, siquidem potius eligentis culpa quam infortunio accidat quæstionem esse indeterminatam.

[20 Quotiescunque inter ludendum deveniatur ad æquationem affectam supra ordinem quadraticum, nihil opus erit exegesi numerosa aut constructione per parabolam, sufficit si radix incognita mutata specie pro cognita habeatur.]

Peractis omnium quæstionum solutionibus, quisque proximi opus percurrat; ad quod Pellii margines conducant.

Quæ pignora et mulctas spectant, quisquam ad libitum comminiscatur: hæc enim aliis permitto.

Problemata quod spectat, illa quidem difficilia non sunt, alioqui inepta forent ad lusum; sed ea tamen, quorum solutio in ingens lusorum commodum cesserit, dum rectum tramitem inire student,

[19] [Vide Appendicem.]—Author. [20] Not in the 1707 edition.

dum longos consequentiarum nexus animo recolunt, integramque analyseos seriem brevissimo conceptu claudere laborant.

Permitte jam, adolescens optime ut alios paulisper alloquar; tibi enim, quem ipsa trahit difficultas, nihil opus hortatore. Vos, adolescentes academici, compello, quibus inest sagacitas, mentisque vigor et acumen; tristem vero in musæo solitudinem, duramque eorum qui vulgo audiunt *Pumps*, vitam aversamini, satius inter congerrones, per jocum et lusum, ingenium prodere ducentes. Videtis quam merus lusus sit algebra, et sors locum habet, et scientia: quidni igitur ad tabulam lusoriam accedatis? Neque enim, quod in chartis, scacchis, dominis, &c. usu venit, ut dum alii ludunt, alii oscitanter adstent, hic etiam metuatis. Nam quotcunque ludendi incesserit libido, iis omnibus ludere simul ac studere, adde et nonnullis, lucelli aliquid corradere fas est. Ast aliquem audire mihi videor in hujusmodi verba erumpentem: Itane vero nos decipi posse putas? Non ii sumus, quos ad difficillimam artem sudore multo addiscendum, oblata lusus specie, inescare liceat. Respondeo, algebram eatenus esse difficilem quantum ad lusum requiritur: quod si tollas omnem difficultatem, tollitur simul recreatio omnis ac voluptas. Siquidem ludi omnes totidem sunt artes et scientiæ; nec aliud est inter cæteros et hunc nostrum discrimen, quam quod illi præsens solummodo oblectamentum spectent; ex hoc vero, præter jucundissimum laborem, alii etiam iique uberrimi fructus percipiantur. Tantum autem abest quod hoc in lusus detrimentum cedat, ut is idcirco omnibus numeris absolutus jure habeatur, juxta tritum illud poetæ,

'Omne tulit punctum qui miscuit utile dulci.'

Sed quinam sunt illi quos prædicas fructus? Hos ut enumerem, universa, quaqua patet, mathesis, artesque omnes ac scientiæ, quas rem militarem, civilem, et philosophicam promoventes complectitur, perlustrandæ forent. Quippe per hasce omnes diffunditur mirifica algebræ vis. Eadem apud omnes ars magna, mirabilis, supremus cognitionis humanæ apex, universæ matheseos nucleus et clavis, imo apud nonneminem scientiarum omnium fundamentum audit. Et sane quam difficile esset algebræ limites assignare, cum philosophiam etiam naturalem et medicinam jamdudum invasit, inque dies dissitissima quæque argumenta aggreditur. Ut alia taceam, in Actis Philosoph. N°. 257, de certitudine testimo-

niorum et traditionum humanarum algebraica extant theoremata. Et pro certo statuendum est, ubicunque datur magis ac minus, ubicunque ratio aliqua aut proportio invenitur, ibi locum habere algebram.

Verum dixerit fortasse aliquis, se nec mathesin ipsam, nec res mathematice tractatas morari. Ut lubet: demus hoc voluntati cujuspiam, demus ignorantiæ: nimirum ex ignorantia rerum præclarissimarum, *quæque vos a barbaris distinguunt*[21], contemptum proficisci affirmare ausim. Estne vero quisquam qui ingenium sagax, intellectum capacem, judicium acre parvi faciat? Siquis usque adeo rationis expers inveniatur, is demum mathesin spernat, quæ quanti sit momenti ad optimos quosque mentis habitus comparandos, apud omnes in confesso est.

Verulamius alicubi, in iis quæ de Augmentis Scientiarum conscripsit[22], analogiam quandam inter pilæ palmariæ lusum et mathesin notat. Nempe quemadmodum per illum, ultra voluptatem quæ primum intenditur, alia eaque potiora consequamur, *viz.* corporis agilitatem et robur, promptumque oculorum motum: sic disciplinæ mathematicæ, præter fines ac usus singulis proprios, illud etiam collaterale habent, quod mentem a sensibus abstrahant, ingeniumque acuant et figant. Idem hoc tam olim veteres, quam hodie e modernis cordatiores quique agnoscunt. Quod vero recentiorum algebra ad ingenium formandum imprimis conducat, inter alios ostendunt Cartesius[23], et prolixe Malbranchius[24] De Inquirenda

[21] [Vide Tentamen Anglicum *de Hortis Epicuri*, a Gulielmo Temple, Equite Aurato conscriptum.]—Author. The reference to Sir William Temple is contained in the following sentence :—'More than this, I know no advantage mankind has gained by the progress of natural philosophy, during so many ages it has had vogue in the world, excepting always and very justly what we owe to the Mathematics, which is in a manner all that seems valuable among the civilised nations, more than those we call barbarians, whether they are so or no, or more so than ourselves.'—*Essay upon the Gardens of Epicurus* (1686). See Temple's *Collected Works*, vol. I. p. 172 (ed. 1720). Cf. *Guardian*, No. 130, in which the above passage is referred to in a similar manner.

[22] The passage alluded to is contained in the *Advancement of Learning*, the earlier work (1605), and is not reproduced in the translation, in the corresponding passage of the *De Augmentis* (1623). The words are these :—'For if the wit be too dull, they (Pure Mathematics) sharpen it; if too wandering, they fix it; if too inherent in sense, they abstract it. So that as tennis is a game of no use in itself, but of great use in respect it maketh a quick eye and a body ready to put itself into all postures: so in the Mathematics, that use which is collateral and intervenient is no less worthy than that which is principal and intended.' *Advancement of Learning*, B. II. But Bacon repeats his recommendation of Mathematics, especially as an education of the power of attention, in the *De Augmentis*, VI. 4, and in the *Essay* on Studies in 1625.

[23] See *Discours de la Méthode*, pp. 143–146, in Cousin's edition of the works of Des Cartes. In another passage in the same work, Des Cartes speaks rather in disparagement of Algebra.

[24] This paragraph contains Berkeley's

Veritate, lib. vi. part 1. cap. 5. et part. 2. cap. 8. alibique passim. Et regulæ quidem quas hic in quæstionum solutione observandas tradit, lib. vi. part. 2. cap. 1. quæque tam sunt eximiæ, ut meliores angelum non fuisse daturum credat auctor quidam ingeniosus: illæ, inquam, regulæ angelicæ ex algebra desumi videntur. At quid alios memorem, cum vir omni laude major, Johannes Lockius, qui singulos intellectus humani defectus, eorumque remedia, siquis alius, optime callebat, cum universæ matheseos, tum præsertim algebræ studium, omnibus supra plebem positis, tanquam rem infiniti usus vehementer commendat? Vide inter Opera ejus Posthuma[25], pag. 30, 31, 32, &c. Tractatus de Regimine Intellectus: opus exiguum quidem illud et imperfectum, sed quod vastis et elaboratis aliorum voluminibus jure quisquam prætulerit. At vero auctor magni nominis ad disciplinas mathematicas acrem nimis meditationem, quæque homini generoso et voluptatibus studenti minus conveniat, requiri putat. Respondeo, suadente Lockio, frustra opponi dissidentis Santevremontii[26] judicium. Deinde hic ineptus matheseos judex merito habeatur, quippe qui, uti ex ejus vita et scriptis plusquam verisimile est, eam vix a limine salutarat. Si vero cortex durus videatur et exsuccus, quid mirum? Sed ut dicam quod res est; præstat singulos rem ipsam expertos propria sequi judicia. Nec est cur quis ingentes difficultates sibi fingat, eo quod vox algebra nescio quid asperum sonat et horrificum; artem enim, quantum ad ludum nostrum requiritur, intra breve unius mensis spatium facile quisquam perdiscat.

Exposita demum lusus et consilii nostri ratione, lectorem mathematicum, ut tenues istas studiorum meorum primitias candide accipiat, rogo, potiora forsan posthac daturus. Impræsentiarum autem me alia distinent studia quæ, arida satis et jejuna, suavissimam mathesin exceperunt. Tu interim, Clarissime Adolescens, hanc nugarum rhapsodiam, tanquam aliquod mei erga te amoris symbolum, cape, et vale.

earliest published allusions to Bacon, Des Cartes, and Malebranche, here adduced as authorities in favour of the study of Mathematics. It may be added that Malebranche, in his *Recherche*, Liv. VI. p. ii. ch. 8, alludes to the commendation of Algebra in Des Cartes' *Discours de la Méthode*.

[25] The reference is to the *Essay on the Conduct of the Understanding*, § 7, eulogized in the following sentence.

[26] Saint Evremond, a famous French wit of the seventeenth century, who came to England in the reign of Charles II, and died there in 1703. He was connected with Bayle, Des Marzeaux, and other men of letters of that time.

APPENDIX.

Ut mentem nostram quilibet plenissime assequatur, visum est, sequentibus paginis, omnem in quæstionibus Combinationum et Specierum varietatem quam præfatæ ludendi conditiones patiantur oculis subjicere.

Notandum autem: Primo, quod sequentes formulæ, quoad modos combinandi et quantitatum species, non item omnes quoad numerum æquationum datarum, ad Cuspides respectivas pertinent: sæpe enim plures quam tres quantitates investigandæ erunt.

Secundo, quod ut omnes quæstionum formulæ haberi possint, metæ diversæ, prout fieri posse supra monuimus, statuendæ sunt: alioqui duæ tantum ex quatuor classibus ad Cuspidem quamcunque pertinebunt.

Primam dico Cupisdem quæ in + laterale dirigitur, secundam huic a dextris proximam, atque ita porro.

AD LECTOREM.

Ista adolescentiæ nostræ, obiter tantum proprioque marte ad quantulamcunque matheseos scientiam olim enitentis, conamina in lucem protrusisse sero aliquoties pœnituit. Quin et pœniteret etiamnum, nisi quod hinc nobile par Ingeniorum, in spem nascentis sæculi succrescentium, una propalandi enascatur occasio. Neque enim nos aliunde Rempublicam Literariam demereri gloriamur. Atque hæc quidem ad temeritatis, &c. censuram, ut et invidiam, si quam mihi forte conflaverim, amoliendum dicta intelligantur.

Cuspis prima.

$$a+e=b\times e\ e-b\ b\times y\ y-b\ e\times b\ b-e\ y\times b\ b-y$$
$$e+y=b-y\ y\times b\ b-a\ a\times b\ y-b\ b\times y\ a-b\ b\times a$$
$$s\ y+a=b\times a\ a-b\ b\times e\ e-b\ a\times b\ b-a\ e\times b\ b-e$$

$$a+e=b\times e\ e-b\ b\times y\ y-b\ e\times b\ b-e\ y\times b\ b-y$$
$$e+y=c-y\ y\times c\ c-a\ a\times c\ y-c\ c\times y\ a-c\ c\times a$$
$$d\ y+a=d\times a\ a-d\ d\times e\ e-d\ a\times d\ d-a\ e\times d\ d-e$$

$$a+e=2\times e\ e-2\ 2\times y\ y-2\ e\times 2\ 2-e\ y\times 2\ 2-y$$
$$e+y=3-y\ y\times 3\ 3-a\ a\times 3\ y-3\ 3\times y\ a-3\ 3\times a$$
$$f\ y+a=4\times a\ a-4\ 4\times e\ e-4\ a\times 4\ 4-a\ e\times 4\ 4-e$$

$$a+e=e\times y\ e-y\ e\times y\ y-e$$
$$e+y=y-a\ y\times a\ a-y\ a\times y$$
$$x\ y+a=a\times e\ a-e\ a\times e\ e-a$$

Cuspis secunda.

$$a+e=b\times e\ b\times y$$
$$e+y=b\times y\ b\times a$$
$$s\ y+a=b\times a\ b\times e$$

$$a+e=b\times e\ b\times y$$
$$e+y=c\times y\ c\times a$$
$$d\ y+a=d\times a\ d\times e$$

$$a+e=2\times e\ 2\times y$$
$$e+y=3\times y\ 3\times a$$
$$f\ y+a=4\times a\ 4\times e$$

$$a+e=e\times y$$
$$e+y=y\times a$$
$$x\ y+a=a\times e$$

Cuspis tertia.

$$a+e\ a-e=e\times b\ y\times b$$
$$s\ e-y\ e+y=y\times b\ a\times b$$
$$y+a\ y-a=a\times b\ e\times b$$

$a+e\ a-e=e\times b\ y\times b$
$d\ e-y\ e+y=y\times c\ a\times c$
$y+a\ y-a=a\times d\ e\times d$

$a+e\ a-e=e\times 2\ y\times 2$
$f\ e-y\ e+y=y\times 3\ a\times 3$
$y+a\ y-a=a\times 4\ e\times 4$

$a+e\ a-e=e\times y$
$x\ e-y\ e+y=y\times a$
$y+a\ y-a=a\times e$

Cuspis quarta.

$a-e=b\times e\ b\times y$
$s\ e-y=b\times y\ b\times a$
$y-a=b\times a\ b\times e$

$a-e=b\times e\ b\times y$
$d\ e-y=c\times y\ c\times a$
$y-a=d\times a\ d\times e$

$a-e=2\times e\ 2\times y$
$f\ e-y=3\times y\ 3\times a$
$y-a=4\times a\ 4\times e$

$a-e=e\times y$
$x\ e-y=y\times a$
$y-a=a\times e$

Cuspis quinta.

$a-e=e\times b\ b\div e\ y\times b\ b\div y\ b\times e\ e\div b\ b\times y\ y\div b$
$s\ e-y=y\div b\ b\times y\ a\div b\ b\times a\ b\div y\ y\times b\ b\div a\ a\times b$
$y-a=a\times b\ b\div a\ e\times b\ b\div e\ b\times a\ a\div b\ b\times e\ e\div b$

$a-e=e\times b\ b\div e\ y\times b\ b\div y\ b\times e\ e\div b\ b\times y\ y\div b$
$d\ e-y=y\div c\ c\times y\ a\div c\ c\div a\ c\div y\ y\times c\ c\div a\ a\times c$
$y-a=a\times d\ d\div a\ e\times d\ d\div e\ d\times a\ a\div d\ d\times e\ e\div d$

$a-e=e\times 2\ 2\div e\ y\times 2\ 2\div y\ 2\times e\ e\div b\ 2\times y\ y\div 2$
$f\ e-y=y\div 3\ 3\times y\ a\div 3\ 3\times a\ 3\div y\ y\times c\ 3\div a\ a\times 3$
$y-a=a\times 4\ 4\div a\ e\times 4\ 4\div e\ 4\times a\ a\div d\ 4\times e\ e\div 4$

$a-e=e\times y\ e\div y\ e\times y\ y\div e$
$x\ e-y=y\div a\ y\times a\ a\div y\ a\times y$
$y-a=a\times e\ a\div e\ a\times e\ e\div a$

Cuspis sexta.

$a-e=b\div e\ b\div y\ e\div b\ y\div b$
$s\ e-y=b\div y\ b\div a\ y\div b\ a\div b$
$y-a=b\div a\ b\div e\ a\div b\ e\div b$

$a-e=b\div e\ b\div y\ e\div b\ y\div b$
$d\ e-y=c\div y\ c\div a\ y\div c\ a\div c$
$y-a=d\div a\ d\div e\ a\div d\ e\div d$

$a-e=2\div e\ 2\div y\ e\div 2\ y\div 2$
$f\ e-y=3\div y\ 3\div a\ y\div 3\ a\div 3$
$y-a=4\div a\ 4\div e\ a\div 4\ e\div 4$

$a-e=e\div y\ y\div e$
$x\ e-y=y\div a\ a\div y$
$y-a=a\div e\ e\div a$

Cuspis septima.

$a-e\ a\times e=e\div b\ b\div e\ y\div b\ b\div y$
$s\ e\times y\ e-y=y\div b\ b\div y\ a\div b\ b\div a$
$y-a\ y\times a=a\div b\ b\div a\ e\div b\ b\div e$

$a-e\ a\times e=e\div b\ b\div e\ y\div b\ b\div y$
$d\ e\times y\ e-y=y\div c\ c\div y\ a\div c\ c\div a$
$y-a\ y\times a=a\div d\ d\div a\ e\div d\ d\div e$

$a-e\ a\times e=e\div 2\ 2\div e\ y\div 2\ 2\div y$
$f\ e+y\ e-y=y\div 3\ 3\div y\ a\div 3\ 3\div a$
$y-a\ y\times a=a\div 4\ 4\div a\ e\div 4\ 4\div e$

$a-e\ a\times e=e\div y\ y\div e$
$x\ e\times y\ e-y=y\div a\ a\div y$
$y-a\ y\times a=a\div e\ e\div a$

Cuspis octava.

$a\times e=e\div b\ b\div e\ y\div b\ b\div y$
$s\ e\times y=y\div b\ b\div y\ a\div b\ b\div a$
$y\times a=a\div b\ b\div a\ e\div b\ b\div e$

$a\times e=e\div b\ b\div e\ y\div b\ b\div y$
$d\ e\times y=y\div c\ c\div y\ a\div c\ c\div a$
$y\times a=a\div d\ d\div a\ e\div d\ d\div e$

$a\times e=e\div 2\ 2\div e\ y\div 2\ 2\div y$
$f\ e\times y=y\div 3\ 3\div y\ a\div 3\ 3\div a$
$y\times a=a\div 4\ 4\div a\ e\div 4\ 4\div e$

$a\times e=e\div y\ y\div e$
$x\ e\times y=y\div a\ a\div y$
$y\times a=a\div e\ e\div a$

Cuspis nona.

$a\times e=b+e\ e\div b\ b+y\ y\div b\ e+b\ b\div e\ y+b\ b\div y$
$s\ e\times y=b+y\ y+b\ b\div a\ a+b\ y\div b\ b+y\ a\div b\ b+a$
$y\times a=b+a\ a\div b\ b+e\ e\div b\ a+b\ b\div a\ e+b\ b\div e$

$a\times e=b+e\ e\div b\ b+y\ y\div b\ e+b\ b\div e\ y+b\ b\div y$
$d\ e\times y=e\div y\ y+c\ c\div a\ a+c\ y\div c\ c+y\ a\div c\ c+a$
$y\times a=d+a\ a\div d\ d+e\ e\div d\ a+d\ d\div a\ e+d\ d\div e$

$a\times e=2+e\ e\div 2\ 2+y\ y\div 2\ e+2\ 2\div e\ y+2\ 2\div y$
$f\ e\times y=3\div y\ y+3\ 3\div a\ a+3\ y\div 3\ 3+y\ a\div 3\ 3+a$
$y\times a=4+a\ a\div 4\ 4+e\ e\div 4\ a+4\ 4\div a\ e+4\ 4\div e$

$a\times e=e+y\ e\div y\ e+y\ y\div e$
$x\ e\times y=y\div a\ y+a\ a\div y\ a+y$
$y\times a=a+e\ a\div e\ a+e\ e\div a$

Cuspis decima.

$$\begin{aligned} a \times e &= e + b \quad y + b \\ s\ e \times y &= y + b \quad a + b \\ y \times a &= a + b \quad e + b \end{aligned}$$

$$\begin{aligned} a \times e &= e + b \quad y + b \\ d\ e \times y &= y + c \quad a + c \\ y \times a &= a + d\ e + d \end{aligned}$$

$$\begin{aligned} a \times e &= e + 2y + 2 \\ f\ e \times y &= y + 3a + 3 \\ y \times a &= a + 4e + 4 \end{aligned}$$

$$\begin{aligned} a \times e &= e + y \\ x\ e \times y &= y + a \\ y \times a &= a + e \end{aligned}$$

Cuspis undecima.

$$\begin{aligned} a \times e\ a \div e &= e + b \quad y + b \\ s\ e \div y\ e \times y &= y + b \quad a + b \\ y \times a\ y \div a &= a + b \quad e + b \end{aligned}$$

$$\begin{aligned} a \times e\ a \div e &= e + b \quad y + b \\ d\ e \div y\ e \times y &= y + c \quad a + c \\ y \times a\ y \div a &= a + d\ e + d \end{aligned}$$

$$\begin{aligned} a \times e\ a \div e &= e + 2 \quad y + 2 \\ f\ e \div y\ e \times y &= y + 3\ a + 3 \\ y \times a\ y \div a &= a + 4\ e + 4 \end{aligned}$$

$$\begin{aligned} a \times e\ a \div e &= e + y \\ x\ e \div y\ e \times y &= y + a \\ y \times a\ y \div a &= a + e \end{aligned}$$

Cuspis duodecima.

$$\begin{aligned} a \div e &= b + e \quad b + y \\ s\ e \div y &= b + y \quad b + a \\ y \div a &= b + a \quad b + e \end{aligned}$$

$$\begin{aligned} a \div e &= b + e\ b + y \\ d\ e \div y &= c + y\ c + a \\ y \div a &= d + a\ d + e \end{aligned}$$

$$\begin{aligned} a \div e &= 2 + e\ 2 + y \\ f\ e \div y &= 3 + y\ 3 + a \\ y \div a &= 4 + e\ 4 + e \end{aligned}$$

$$\begin{aligned} a \div e &= e + y \\ x\ e \div y &= y + a \\ y \div a &= a + e \end{aligned}$$

Cuspis decima tertia.

$$\begin{aligned} a \div e &= e + b\ b - e\ y + b\ b - y\ b + e\ e - b\ b + y\ y - b \\ s\ e \div y &= y - b\ b + y\ a - b\ b + a\ b - y\ y + b\ b - a\ a + b \\ y \div a &= a + b\ b - a\ e + b\ b - e\ b + a\ a - b\ b + e\ e - b \end{aligned}$$

$$\begin{aligned} a \div e &= e + b\ b - e\ y + b\ b - y\ b + e\ e - b\ b + y\ y - b \\ d\ e \div y &= y - c\ c + y\ a - c\ c + a\ c - y\ y + c\ c - a\ a + c \\ y \div a &= a + d\ d - a\ e + d\ d - e\ d + a\ a - d\ d + e\ e - d \end{aligned}$$

$$\begin{aligned} a \div e &= e + 2\ 2 - ey + 2\ 2 - y\ 2 + e\ e - 2\ 2 + y\ y - 2 \\ x\ e \div y &= y - 3\ 3 + ya - 3\ 3 + a\ 3 - yy + 3\ 3 - aa + 3 \\ y \div a &= a + 4\ 4 - ae + 4\ 4 - e\ 4 + a\ a - 4\ 4 + e\ e - 4 \end{aligned}$$

$$\begin{aligned} a \div e &= e + y\ e - y\ e + y\ y - e \\ x\ e \div y &= y - a\ y + a\ a - y\ a + y \\ y \div a &= a + e\ a - e\ a + e\ e - a \end{aligned}$$

Cuspis decima quarta.

$$\begin{aligned} a \div e &= b - e\ b - y\ e - b\ y - b \\ s\ e \div y &= b - y\ b - a\ y - b\ a - b \\ y \div a &= b - a\ b - e\ a - b\ e - b \end{aligned}$$

$$\begin{aligned} a \div e &= b - e\ b - y\ e - b\ y - b \\ d\ e \div y &= c - y\ c - a\ y - c\ a - c \\ y \div a &= d - a\ d - e\ a - d\ e - d \end{aligned}$$

$a \div e = 2-e\ 2-y\ e-2\ y-2$
$f\ e \div y = 3-y\ 3-a\ y-3\ a-3$
$y \div a = 4-a\ 4-e\ a-4\ e-4$

$a \div e = e-y\ y-e$
$x\ e \div y = y-a\ a-y$
$y \div a = a-e\ e-a$

Cuspis decima quinta.

$a \div e\ a+e = e-b\ y-b\ b-e\ b-y$
$s\ e+y\ e \div y = y-b\ a-b\ b-y\ b-a$
$y \div a\ y+a = a-b\ e-b\ b-a\ b-e$

$a \div e\ a+e = e-b\ y-b\ b-e\ b-y$
$d\ e+y\ e \div y = y-c\ a-c\ c-y\ c-a$
$y \div a\ y+a = a-d\ e-d\ d-a\ d-e$

$a \div e\ a+e = e-2\ y-2\ 2-e\ 2-y$
$f\ e+y\ e \div y = y-3\ a-3\ 3-y\ 3-a$
$y \div a\ y+a = a-4\ e-4\ 4-a\ 4-a$

$a \div e\ a+e = e-y\ y-e$
$x\ e+y\ e \div y = y-a\ a-y$
$y \div a\ y+a = a-e\ e-a$

Cuspis decima sexta.

$a+e = e-b\ y-b\ b-e\ b-y$
$s\ e+y = y-b\ a-b\ b-y\ b-a$
$y+a = a-b\ e-b\ b-a\ b-e$

$a+e = e-b\ y-b\ b-e\ b-y$
$d\ e+y = y-c\ a-c\ c-y\ c-a$
$y+a = a-d\ e-d\ d-a\ d-e$

$a+e = e-2\ y-2\ 2-e\ 2-y$
$f\ e+y = y-3\ a-3\ 3-y\ 3-a$
$y+a = a-4\ e-4\ 4-a\ 4-e$

$$\begin{aligned} a+e &= e-y \quad y-e \\ x\ e+y &= y-a \quad a-y \\ y+a &= a-e \quad e-a \end{aligned}$$

N. B. Est et alia varietas in prioribus æquationum membris, ubi signum analyticum reperitur, *viz.* si Species transponamus. *E. g.* in cuspide quarta adhibitis $\left\{\begin{matrix} e-a \\ y-e \\ a-y \end{matrix}\right\}$ in duodecima $\left\{\begin{matrix} e\div a \\ y\div e \\ a\div y \end{matrix}\right\}$ duplicabuntur quæstiones.

[[1]Ne quis forte putet quæstiones omnes in ludo nostro possibiles a Tabulis exhiberi, notandum est illas revera esse innumeras. Nam metæ infinities variari poterunt: ex his vero pendet numerus quantitatum in quovis problemate quæsitarum, qui proinde pro metarum diversitate erit infinite variabilis; unde quæstiones orientur innumeræ, in quarum tamen singulis non aliæ servandæ sunt methodi pro signis, combinationibus, et speciebus determinandis, quam quæ in solis quæstionibus imparis cujusvis præter unitatem numeri quantitatum quæsitarum atque adeo in Tabulis quas apposuimus exhibeantur.]

[1] Not contained in the 1707 edition.

DE

MOTU:

SIVE

DE MOTUS PRINCIPIO ET NATURA, ET DE CAUSA COMMUNICATIONIS MOTUUM.

1721.

DE MOTU[1].

1. Ad veritatem inveniendam præcipuum est cavisse ne voces male intellectæ[2] nobis officiant: quod omnes fere monent philosophi, pauci observant. Quanquam id quidem haud adeo difficile videtur, in rebus præsertim physicis tractandis, ubi locum habent sensus, experientia, et ratiocinium geometricum. Seposito igitur, quantum licet, omni præjudicio, tam a loquendi consuetudine

[1] This curious and valuable Tract is Berkeley's first appearance as an author after his famous Dialogues on Matter, published in 1713. It is said to have been written at Lyons in 1720, on his way home from Italy, and to have been sent to the Royal Academy of Sciences at Paris. The subject was proposed by that Society in 1720, for a prize. The Memoir which gained the prize was written by Crousaz, Professor of Philosophy and Mathematics at Lausanne, and author of the well-known manual of Logic. That Berkeley should have failed in the competition need not surprise us, when we consider the boldness with which, in this tract, he attacks received opinions, and assails ontological assumptions which are still powerful. It was published in London in 1721, soon after its author's return to England, and republished by him in his *Miscellany* in 1752.

The *De Motu* contains a Theory of Causation—efficient and physical. Abstractions and misuse of language are accused of mystifying our notion of Power. The notion is referred to our consciousness of personal activity or volition—the only example in our experience of a Cause properly so called. Throughout this Tract, Berkeley reiterates and applies the favourite doctrine of his *Principles* and *Dialogues*—that activity belongs to *minds* or *persons* exclusively; and that the supposed relation of Causation among sensible things is really one of Sign and Signification, not of Cause and Effect. The movements of the material world are thus a natural language, originating in, and inspired by, Supreme Mind.

The Tract opens with two introductory sections, on the abuse of abstract terms in ancient and modern philosophy—especially those which refer to Motion, and Power or Force. What follows may be subdivided into three parts:—

(1) Sect. 3—42 investigate the Principle or Efficient Cause (*principium*) of motion, and offer proof that this is and must be Mind. The vulgar hypothesis, that power is inherent in body, is attributed to the confusion introduced into our conceptions by metaphysical abstractions. When we duly attend to our experience, we find that sensible things are essentially passive, and that terms significant of causality have no meaning as applied to them. Spirit is the sole origin of motion. '*Mens agitat molem.*' The evidence of experience is alleged for this.

(2) The Nature or Definition of motion is the theme of sect. 43—66. Motion itself is something clearly enough perceived by the senses. It has been obscured by the conjectures of philosophers. Some examples of obscure definitions of motion are given. Power or force, the cause of motion, it is argued, on the other hand, transcends the senses and appertains to Mind. Motions themselves, the effects of this spiritual efficiency, are alone objects of sense, and their laws form physical science. Motion is simply the successive appearances of sensible things in a variety of places. And place is relative, not absolute. Absolute place and absolute space are alike absurd. They are both due to confusion of thought, generated by abstraction. All place and all space must be relative, and given in the concrete experience of the senses.

(3) The cause of the Communication of

quam a philosophorum auctoritate nato, ipsa rerum natura diligenter inspicienda. Neque enim cujusquam auctoritatem usque adeo valere oportet, ut verba ejus et voces in pretio sint, dummodo nihil clari et certi iis subesse comperiatur.

2. Motus contemplatio mire torsit veterum[3] philosophorum mentes, unde natæ sunt variæ opiniones supra modum difficiles, ne dicam absurdæ, quæ, quum jam fere in desuetudinem abierint, haud merentur ut iis discutiendis nimio studio immoremur. Apud recentiores autem et saniores hujus ævi[4] philosophos, ubi de Motu agitur, vocabula haud pauca abstractæ nimium et obscuræ significationis occurrunt, cujusmodi sunt *solicitatio gravitatis*, *conatus*, *vires mortuæ*, &c. quæ scriptis alioqui doctissimis tenebras offundunt, sententiisque non minus a vero quam a sensu hominum communi abhorrentibus ortum præbent. Hæc vero necesse est ut, veritatis gratia, non alios refellendi studio, accurate discutiantur.

3. Solicitatio et nisus, sive conatus, rebus solummodo animatis[5] revera competunt. Cum aliis rebus tribuuntur, sensu metaphorico accipiantur necesse est. A metaphoris autem abstinendum philosopho. Porro, seclusa omni tam animæ affectione quam corporis motione, nihil clari ac distincti iis vocibus significari, cuilibet constabit qui modo rem serio perpenderit.

motion among bodies is considered in the remaining sections of the Essay. The only true or efficient cause of motion and of its diffusion, as was argued in the preceding sections, is the Intelligence to which all corporeal change is due. But the rules according to which it takes place—the Laws of motion—may be termed its *mechanical* or *apparent* cause. If we remember that physical causation means only the order according to which sensible changes take place—that it is only Natural Language—we may speak of motions transmitted by mechanical causes. But Causation properly so called belongs to metaphysics or primary philosophy, and active causes can be drawn forth from the shades in which they are involved only by contemplation and reasoning.

The *De Motu* should be compared, on the one hand, with Berkeley's *Principles* and *Dialogues* on Matter, and, on the other hand, with *Siris*, being itself intermediate between his earlier and later philosophy. See also *Alciphron*, Dial. VII. sect. 4.

[2] 'voces male intellectæ.' Cf. *Principles of Human Knowledge*, 'Introduction,' sect. 6, 23—25.

[3] 'veterum.' The history of ancient speculations about motion, from the paradoxes of Zeno downwards, is, in some sort, a history of ancient metaphysics. The problem involves the nature of Space, Time, and Sensible Things, and their ultimate relation to Mind.

[4] 'hujus ævi.' See Bacon, *De Motu*, and the questions raised by Newton, Leibnitz, and others, alluded to in the following sections.

[5] 'animatis.' Sect. 3—42 refer the various terms in language which signify the *cause* of motion exclusively to animated being, mind, or spirit, and interpret metaphorically their application to sensible things.

4. Quamdiu corpora gravia a nobis sustinentur, sentimus in nobismet ipsis nisum, fatigationem, et molestiam. Percipimus etiam in gravibus cadentibus motum acceleratum versus centrum telluris; ope sensuum præterea nihil. Ratione tamen colligitur causam esse aliquam vel principium horum phænomenon; illud autem *gravitas* vulgo nuncupatur. Quoniam vero causa descensus gravium cæca sit et incognita, gravitas ea acceptione proprie dici nequit qualitas sensibilis; est igitur qualitas occulta. Sed vix, et ne vix quidem, concipere licet quid sit qualitas occulta, aut qua ratione qualitas ulla agere aut operari quidquam possit. Melius itaque foret, si, missa qualitate occulta, homines attenderent solummodo ad effectus sensibiles; vocibusque abstractis (quantumvis illæ ad disserendum utiles sint) in meditatione omissis, mens in particularibus et concretis, hoc est in ipsis rebus, defigeretur.

5. *Vis*[6] similiter corporibus tribuitur: usurpatur autem vocabulum illud, tanquam significaret qualitatem cognitam, distinctamque tam a motu, figura, omnique alia re sensibili, quam ab omni animali affectione: id vero nihil aliud esse quam qualitatem occultam, rem acrius rimanti constabit. Nisus animalis et motus corporeus vulgo spectantur tanquam symptomata et mensuræ hujus qualitatis occultæ.

6. Patet igitur gravitatem aut vim frustra poni pro principio[7] motus: nunquid enim principium illud clarius cognosci potest ex eo quod dicatur qualitas occulta? Quod ipsum occultum est, nihil explicat: ut omittamus causam agentem incognitam rectius dici posse substantiam quam qualitatem. Porro *vis*, *gravitas*, et istiusmodi voces, sæpius, nec inepte, in concreto usurpantur, ita ut connotent corpus motum, difficultatem resistendi, &c. Ubi vero a philosophis adhibentur ad significandas naturas quasdam ab hisce omnibus præcisas et abstractas, quæ nec sensibus subjiciuntur, nec ulla mentis vi intelligi nec imaginatione effingi[8] possunt, tum demum errores et confusionem pariunt.

[6] 'vis.' This supposed *power* or *force* in matter is the great example offered of the abuse of abstractions. It seems easily conceivable, but reflection dissolves the apparent meaning. Cf. *Siris*, sect. 248.

[7] 'principio'—the ultimate explanation or efficient cause. Cf. sect. 36. Mere metaphors, due to metaphysical abstraction, are accepted for explanations, it is argued, when 'gravity,' 'bodily power,' or 'force,' are taken as causes of motion. To call these 'occult causes' is to say nothing. The sensible effects and their laws are all we know through sense. Mere physicists are still deluded by these metaphors.

[8] Cf. sect. 53, where *sense*, *intelligence*, and *imagination* are distinguished from one another.

7. Multos autem in errorem ducit, quod voces generales et abstractas in disserendo utiles[9] esse videant, nec tamen earum vim satis capiant. Partim vero a consuetudine vulgari inventæ sunt illæ ad sermonem abbreviandum, partim a philosophis ad docendum excogitatæ; non quod ad naturas rerum accommodatæ sint, quæ quidem singulares et concretæ existunt, sed quod idoneæ ad tradendas disciplinas, propterea quod faciant notiones, vel saltem propositiones, universales.

8. Vim corpoream esse aliquid conceptu facile plerumque, existimamus. Ii tamen qui rem accuratius inspexerunt in diversa sunt opinione, uti apparet ex mira verborum obscuritate qua laborant ubi illam explicare conantur. Torricellius ait vim et impetum esse res quasdam abstractas subtilesque et quintessentias, quæ includuntur in substantia corporea, tanquam in vase magico Circes[10]. Leibnitius item in naturæ vi explicanda hæc habet—*Vis activa, primitiva, quæ est ἐντελέχεια πρώτη, animæ vel formæ substantiali respondet.* Vide *Acta Erudit. Lips.* Usque adeo necesse est ut vel summi viri, quamdiu abstractionibus indulgent, voces nulla certa significatione præditas, et meras scholasticorum umbras sectentur. Alia ex neotericorum scriptis, nec pauca quidem ea, producere liceret, quibus abunde, constaret, metaphysicas abstractiones non usquequaque cessisse mechanicæ et experimentis, sed negotium inane philosophis etiamnum facessere.

9. Ex illo fonte derivantur varia absurda, cujus generis est illud—*vim percussionis, utcunque exiguæ, esse infinite magnam.* Quod sane supponit, gravitatem esse qualitatem quendam realem ab aliis omnibus diversam; et gravitationem esse quasi actum hujus qualitatis a motu realiter distinctum: minima autem percussio producit effectum majorem quam maxima gravitatio sine motu; illa scilicet motum aliquem edit, hæc nullum. Unde sequitur, vim percussionis ratione infinita excedere vim gravitationis, hoc est, esse infinite magnam[11]. Videantur experimenta Galilæi, et quæ de definita vi percussionis scripserunt Torricellius, Borellus, et alii.

[9] 'utiles.' Cf. *Alciphron*, Dial. VII. sect. 8, 17.

[10] [La Materia altro non e che un vaso di Circe incantato, il quale serve per ricettacolo della forza et de momenti dell' impeto. La forza l'impeti sono astratti tanto sottili, sono quintessenze tanto spiritose, che in altre ampolle non si possono rachiudere, fuor che nell' intima corpulenza de solidi naturali, Vide *Lezioni Academiche.*]—Author. This comparison of Matter to the enchanted vase of Circe, illustrates a mass of crude physical speculation. With this and the six following sections cf. *Alciphron*, Dial. VII.

[11] See Borellus, *De Vi Percussionis*, cap. XXIV. prop. 88. and cap. XXVII.

10. Veruntamen fatendum est vim nullam per se immediate sentiri, neque aliter quam per effectum[12] cognosci et mensurari. Sed vis mortuæ, seu gravitationis simplicis, in corpore quiescente subjecto, nulla facta mutatione, effectus nullus est; percussionis autem, effectus aliquis. Quoniam, ergo, vires sunt effectibus proportionales, concludere licet vim mortuam[13] esse nullam. Neque tamen propterea vim percussionis esse infinitam: non enim oportet quantitatem ullam positivam habere pro infinita, propterea quod ratione infinita superet quantitatem nullam sive nihil.

11. Vis gravitationis a momento secerni nequit; momentum autem sine celeritate nullum est, quum sit moles in celeritatem ducta: porro celeritas sine motu intelligi non potest; ergo nec vis gravitationis. Deinde vis nulla nisi per actionem innotescit, et per eandem mensuratur; actionem autem corporis a motu præscindere non possumus; ergo quamdiu corpus grave plumbi subjecti vel chordæ figuram mutat, tamdiu movetur; ubi vero quiescit, nihil agit, vel, quod idem est, agere prohibetur. Breviter, voces istæ *vis mortua* et *gravitatio*, etsi per abstractionem metaphysicam aliquid significare supponuntur diversum a movente, moto, motu et quiete, revera tamen id totum nihil est.

12. Siquis diceret pondus appensum vel impositum agere in chordam, quoniam impedit quominus se restituat vi elastica: dico, pari ratione corpus quodvis inferum agere in superius incumbens, quoniam illud descendere prohibet: dici vero non potest actio corporis, quod prohibeat aliud corpus existere in eo loco quem occupat.

13. Pressionem corporis gravitantis quandoque sentimus. Verum sensio ista molesta oritur ex motu corporis istius gravis fibris nervisque nostri corporis communicatio, et eorundem situm immutante; adeoque percussioni accepta referri debet. In hisce rebus multis et gravibus præjudiciis laboramus, sed illa acri atque iterata meditatione subigenda sunt[14], vel potius penitus averruncanda.

[12] 'per effectum,' i. e. by its sensible effects—power or force not being, in itself, a dead object of the senses, but the living spiritual efficacy of which we are conscious. Cf. *Siris*, sect. 250.

[13] 'vim mortuam.' The only power recognised in this philosophy is the living power of Mind, perpetually active in the universe, in itself imperceptible through the senses, and revealed to them only in its sensible effects. 'Dead power' and 'gravitation' are distinguished from the sensible effects called 'rest' and 'motion' only through an illusion due to metaphysical abstraction. There is no physical power intermediate between spiritual agency, on the one hand, and the order we observe in the sensible effects of that agency, on the other. Cf. sect. 11.

[14] 'meditatione subigenda sunt.' Cf. *Theory of Vision Vindicated*, sect. 35, 70.

14. Quo probetur quantitatem ullam esse infinitam, ostendi oportet partem aliquam finitam homogeneam in ea infinities contineri. Sed vis mortua se habet ad vim percussionis, non ut pars ad totum, sed ut punctum ad lineam, juxta ipsos vis infinitæ percussionis auctores. Multa in hanc rem adjicere liceret, sed vereor ne prolixus sim.

15. Ex principiis præmissis lites insignes solvi possunt, quæ viros doctos multum exercuerunt. Hujus rei exemplum sit controversia illa de proportione virium. Una pars dum concedit, momenta, motus, impetus, data mole, esse simpliciter ut velocitates, affirmat vires esse ut quadrata velocitatum. Hanc autem sententiam supponere vim corporis distingui[15] a momento, motu, et impetu; eaque suppositione sublata corruere, nemo non videt.

16. Quo clarius adhuc appareat, confusionem quandam miram per abstractiones metaphysicas in doctrinam de motu introductam esse, videamus quantum intersit inter notiones virorum celebrium de vi et impetu. Leibnitius impetum cum motu confundit. Juxta Newtonum[16] impetus revera idem est cum vi inertiæ. Borellus[17] asserit impetum non aliud esse quam gradum velocitatis. Alii impetum et conatum inter se differre, alii non differre volunt. Plerique vim motricem motui proportionalem intelligunt. Nonnulli aliam aliquam vim præter motricem, et diversimode mensurandam, utpote per quadrata velocitatum in moles, intelligere præ se ferunt. Sed infinitum esset hæc prosequi.

17. *Vis*, *gravitas*, *attractio*, et hujusmodi voces, utiles[18] sunt ad ratiocinia et computationes de motu et corporibus motis; sed non ad intelligendam simplicem ipsius motus naturam, vel ad qualitates totidem distinctas designandas. Attractionem certe quod attinet, patet illam ab Newtono adhiberi, non tanquam qualitatem veram et physicam, sed solummodo ut hypothesin mathematicam[19].

[15] 'distingui.' It is here argued that so-called power in the material world is indistinguishable from the sensible phenomena or effects—in short, that there is no real power in matter. To the inconceivable supposition that there is, he attributes the differences among the learned mentioned in the following section. The province of natural philosophy, according to Berkeley, is to inquire what the general rules are according to which sensible effects are manifested. Cf. *Siris*, sect. 236, 247, 249.

[16] *Principia Math.* Def. III.

[17] *De Vi Percussionis*, cap. I.

[18] 'utiles.' Berkeley's doctrine of the function of common terms as useful instruments for calculation, even when not significant of what he calls *ideas*, is illustrated in *Alciphron*, Dial. VII. So here such words as 'force,' 'power,' 'gravity,' 'attraction,' are allowed to be convenient in physical reasonings about the *laws* of motion, but worthless as philosophical expressions of the *cause* of motion, which transcends sense. Cf. *Siris*, sect. 234, 235.

[19] Cf. sect. 67.

Quinetiam Leibnitius, nisum elementarem seu solicitationem ab impetu distinguens, fatetur illa entia non re ipsa inveniri in rerum natura, sed abstractione facienda esse.

18. Similis ratio est compositionis et resolutionis virium quarumcunque directarum in quascunque obliquas, per diagonalem et latera parallelogrammi. Hæc mechanicæ et computationi inserviunt: sed aliud est computationi et demonstrationibus mathematicis inservire, aliud rerum naturam exhibere.

19. Ex recentioribus multi sunt in ea opinione, ut putent motum neque destrui nec de novo gigni, sed eandem[20] semper motus quantitatem permanere. Aristoteles etiam dubium illud olim proposuit—utrum motus factus sit et corruptus, an vero ab æterno? *Phys.* lib. xiii. Quod vero motus sensibilis pereat, patet sensibus: illi autem eundem, impetum, nisum, aut summam virium eandem manere velle videntur. Unde affirmat Borellus, vim in percussione non imminui, sed expandi; impetus etiam contrarios suscipi et retineri in eodem corpore. Item Leibnitius nisum ubique et semper esse in materia, et ubi non patet sensibus, ratione intelligi contendit.—Hæc autem nimis abstracta esse et obscura, ejusdemque fere generis cum formis substantialibus et entelechiis, fatendum.

20. Quotquot, ad explicandum motus causam atque originem, vel principio hylarchico, vel naturæ indigentia, vel appetitu, aut denique instinctu naturali utuntur, dixisse aliquid potius quam cogitasse censendi sunt. Neque ab hisce multum absunt qui supposuerint[21], *partes terræ esse se moventes*, *aut etiam spiritus iis implantatos ad instar formæ*, ut assignent causam accelerationis gravium cadentium: aut qui dixerit[22], "in corpore præter solidam extensionem debere etiam poni aliquid unde virium consideratio oriatur." Siquidem hi omnes vel nihil particulare et determinatum enuntiant; vel, si quid sit, tam difficile erit illud explicare, quam id ipsum cujus explicandi causa adducitur[23].

21. Frustra ad naturam illustrandum abhibentur ea quæ nec

[20] 'eandem.' So in recent discussions on the conservation of force.

[21] [Borellus.]—Author. See *De Vi Percussionis*, cap XXIII.

[22] [Leibnitius.]—Author.

[23] On Berkeley's reasoning in the text, all terms which involve the assumption of a real causality in the material world are merely a cover for meaninglessness. Only through our experience of personal activity does meaning enter into this portion of language. This is argued in detail in sect. 21—35.

sensibus patent, nec ratione intelligi possunt. Videndum ergo quid sensus, quid experientia, quid demum ratio iis innixa suadeat. Duo sunt summa rerum genera—*corpus* et *anima*. Rem extensam, solidam, mobilem, figuratam, aliisque qualitatibus quæ sensibus occurrunt præditam, ope sensuum; rem vero sentientem, percipientem, intelligentem, conscientia quadam interna cognovimus. Porro, res istas plane inter se diversas[24] esse, longeque heterogeneas[24], cernimus. Loquor autem de rebus cognitis: de incognitis enim disserere nil juvat.

22. Totum id quod novimus, cui nomen *corpus* indidimus, nihil[25] in se continet quod motus principium seu causa efficiens esse possit:—etenim impenetrabilitas, extensio, figura nullum includunt vel connotant potentiam producendi motum; quinimo e contrario non modo illas, verum etiam alias, quotquot sint, corporis, qualitates sigillatim percurrentes, videbimus omnes esse revera passivas, nihilque iis activum inesse, quod ullo modo intelligi possit tanquam fons et principium motus. Gravitatem quod attinet, voce illa nihil cognitum et ab ipso effectu sensibili, cujus causa quæritur, diversum significari jam ante ostendimus. Et sane quando corpus grave dicimus, nihil aliud intelligimus, nisi quod feratur deorsum, de causa hujus effectus sensibilis nihil omnino cogitantes.

23. De corpore itaque audacter pronunciare licet, utpote de re comperta, quod non sit principium motus. Quod si quisquam, præter solidam extensionem ejusque modificationes, vocem *corpus* qualitatem etiam *occultam*, virtutem, formam, essentiam complecti sua significatione contendat; licet quidem illi inutili negotio sine ideis disputare, et nominibus nihil distincte exprimentibus abuti. Cæterum sanior philosophandi ratio videtur ab notionibus abstractis et generalibus (si modo notiones dici debent quæ intelligi nequeunt) quantum fieri potest abstinuisse.

[24] 'diversas'—'heterogeneas.' Cf. *Principles of Human Knowledge*, sect. 1, 2, in which our knowledge is classified by reference to its constituent faculties; and in which mind or personality, said here to be revealed by an internal consciousness (*conscientia quadam interna*), is contrasted with sensible things or ideas revealed in sense (*ope sensuum*).

[25] 'nihil.' Cf. *Principles of Human Knowledge*, e.g. sect. 26, 65, 66, where the essential passivity of *ideas* given in sense, or the material world, is maintained as a cardinal principle of the Berkeleian philosophy—on the positive ground of our experience of what sensible things are. Cf. *Siris*, sect. 155, 292. On the other hand, to speak of 'the origin of motion as *something in matter*' is, he argues (sect. 24), merely to say that we know nothing about the origin of motion. Cf. sect. 28, 29, infra.

24. Quicquid continetur in idea corporis novimus; quod vero novimus in corpore, id non esse principium motus constat. Qui præterea aliquid incognitum in corpore, cujus ideam nullam habent, comminiscuntur, quod motus principium dicant, ii revera nihil aliud quam principium motus esse incognitum dicunt. Sed hujusmodi subtilitatibus diutius immorari piget.

25. Præter res corporeas, alterum est genus *rerum cogitantium*[26]. In iis autem potentiam inesse corpora movendi, propria experientia didicimus; quandoquidem anima nostra pro lubitu possit ciere et sistere membrorum motus, quacunque tandem ratione id fiat. Hoc certe constat, corpora moveri ad nutum animæ, eamque proinde haud inepte dici posse principium motus; particulare quidem et subordinatum, quodque ipsum dependeat a primo et universali Principio[27].

26. Corpora gravia feruntur deorsum, etsi nullo impulsu apparente agitata; non tamen existimandum propterea in iis contineri principium motus: cujus rei hanc rationem assignat Aristoteles[28]: "Gravia et levia (inquit), non moventur a seipsis; id enim vitale esset, et se sistere possent." Gravia omnia una eademque certa et constanti lege centrum telluris petunt, neque in ipsis animadvertitur principium vel facultas ulla motum istum sistendi, minuendi, vel, nisi pro rata proportione, augendi, aut denique ullo modo immutandi: habent adeo se passive. Porro idem, stricte et accurate loquendo, dicendum de corporibus percussivis. Corpora ista quamdiu moventur, ut et in ipso percussionis momento, si gerunt passive, perinde scilicet atque cum quiescunt. Corpus iners tam agit quam corpus motum, si res ad verum exigatur: id quod agnoscit Newtonus[29], ubi ait, vim inertiæ esse eandem cum impetu. Corpus autem iners et quietum nihil agit, ergo nec motum.

27. Revera corpus æque perseverat in utrovis statu, vel motus vel quietis. Ista vero perseverantia non magis dicenda est actio corporis, quam existentia ejusdem actio diceretur. Perseverantia

[26] 'genus rerum cogitantium.' Cf. *Principles of Human Knowledge*, sect. 2, in which the *Ego*, or Self is distinguished from 'ideas' or the *non-Ego*. For Berkeley's reference of all the power in the universe exclusively to spirits, cf. *Principles*, sect. 26—33; also sect. 30 infra.

[27] 'a primo et universali Principio'—i.e. the Divine Spirit, on whom human and other finite spirits depend, in a way which Berkeley does not attempt to rationalize.

[28] Cf. *Siris*, sect. 280.

[29] *Princip. Math.* Def. III.

nihil aliud est quam continuatio in eodem modo existendi, quæ proprie dici actio non potest. Cæterum resistentiam, quam experimur in sistendo corpore moto, ejus actionem esse fingimus vana specie delusi. Revera enim ista resistentia[30] quam sentimus, passio est in nobis, neque arguit corpus agere, sed nos pati: constat utique nos idem passuros fuisse, sive corpus illud a se moveatur, sive ab alio principio impellatur.

28. Actio et reactio dicuntur esse in corporibus: nec incommode[31] ad demonstrationes mechanicas. Sed cavendum, ne propterea supponamus virtutem aliquam realem, quæ motus causa sive principium sit, esse in iis. Etenim voces illæ eodem modo intelligendæ sunt ac vox *attractio*; et quemadmodum hæc est hypothesis solummodo mathematica[32], non autem qualitas physica: idem etiam de illis intelligi debet, et ob eandem rationem. Nam sicut veritas et usus theorematum de mutua corporum attractione in philosophia mechanica stabiles manent, utpote unice fundati in motu corporum, sive motus iste causari supponatur per actionem corporum se mutuo attrahentium, sive per actionem agentis alicujus a corporibus diversi impellentis et moderantis corpora; pari ratione, quæcunque tradita sunt de regulis et legibus motuum, simul ac theoremata inde deducta, manent inconcussa, dum modo concedantur effectus sensibilis, et ratiocinia iis innixa; sive supponamus actionem ipsam, aut vim horum effectuum causatricem, esse in corpore, sive in agente incorporeo.

29. Auferantur ex idea corporis extensio, soliditas, figura, remanebit, nihil[33]. Sed qualitates istæ sunt ad motum indifferentes, nec in se quidquam habent quod motus principium dici possit. Hoc ex ipsis ideis nostris perspicuum est. Si igitur voce *corpus* significatur id quod concipimus, plane constat inde non peti posse principium motus: pars scilicet nulla aut attributum illius causa efficiens vera est, quæ motum producat. Vocem autem proferre, et nihil concipere, id demum indignum esset philosopho.

[30] 'resistentia.' The sensation of resistance is vulgarly offered as in itself evidence of the independent existence of material Substance and Cause, although it is really a sensation dependent on consciousness.

[31] 'incommode.' Cf. sect. 17, and note.

[32] 'hypothesis mathematica.' Cf. sect. 17, 35, 36—41, 66, 67; also *Siris*, sect. 250—251.

[33] 'nihil.' Cf. the theory of Matter contained in the *Principles* and *Dialogues* passim, and afterwards in *Siris*. This section sums up Berkeley's objections to crediting *matter* with real power. It may be compared and harmonized with Hume, Dr. Thomas Brown, and Mr. J. S. Mill on Causation. But Berkeley differs from the positive philosophers in recognizing true efficiency in the spiritual world.

30. Datur res cogitans, activa, quam principium motus esse in nobis experimur. Hanc *animam*, *mentem*, *spiritum* dicimus. Datur etiam res extensa, iners, impenetrabilis, mobilis, quæ a priori toto cœlo differt, novumque genus[34] constituit. Quantum intersit inter res cogitantes et extensas, primus omnium deprehendens Anaxagoras, vir longe sapientissimus, asserebat mentem nihil habere cum corporibus commune, id quod constat ex primo libro Aristotelis *De Anima*[35]. Ex neotericis idem optime animadvertit Cartesius[36]. Ab eo alii[37] rem satis claram vocibus obscuris impeditam ac difficilem reddiderunt.

31. Ex dictis manifestum est eos qui vim activam, actionem, motus principium, in *corporibus* revera inesse affirmant, sententiam nulla experientia fundatam amplecti, eamque terminis obscuris et generalibus adstruere, nec quid sibi velint satis intelligere. E contrario, qui *mentem* esse principium motus volunt, sententiam propria experientia munitam proferunt, hominumque omni ævo doctissimorum suffragiis comprobatam.

32. Primus Anaxagoras[38] τὸν νοῦν introduxit, qui motum inerti materiæ imprimeret. Quam quidem sententiam probat etiam Aristoteles[39], pluribusque confirmat, aperte pronuncians primum movens esse immobile, indivisibile, et nullam habens magnitudinem. Dicere autem, omne motivum esse mobile, recte animadvertit idem esse ac siquis diceret, omne ædificativum esse ædificabile, *Physic.* lib. viii. Plato insuper in Timæo[40] tradit machinam hanc corpoream, seu mundum visibilem, agitari et animari a mente, quæ sensum omnem fugiat. Quinetiam hodie philosophi Cartesiani[41] principium motuum naturalium Deum agnoscunt. Et

[34] 'novumque genus.' Cf. sect. 21 We have here Berkeley's antithesis of mind and matter—active personality in contrast to the passive ideas which stream through the senses. This distinction he supports by experience and authority, sect. 31, 32.

[35] *De Anima*, I. ii. 13. 22, 24.

[36] 'Cartesius.' The antithesis of extended and thinking Substance pervades the philosophy of Des Cartes. See e.g. *Principia*, P. I. §§ 63, 64.

[37] 'Ab eo alii.' Does he refer to Locke, who suggests the possibility of matter thinking?

[38] See Aristotle, *De Anima*, I. ii. 5, 13; Diogenes Laertius, lib. VI. i. 6.

[39] *Nat. Ausc.*, VIII. 15; also *De Anima*, III. x. 7.

[40] Hardly any passage in the *Timæus* exactly corresponds to this. The following is, perhaps, the most pertinent :—Κίνησιν γὰρ ἀπένειμεν αὐτῷ τὴν τοῦ σώματος οἰκείαν, τῶν ἑπτὰ τὴν περὶ νοῦν καὶ φρόνησιν μάλιστα οὖσαν (p. 34 a). Aristotle quotes the *Timæus* in the same connection, *De Anima*, I. iii. 11.

[41] 'philosophi Cartesiani.' Secundum Cartesium causa generalis omnium motuum et quietum est Deus.—Derodon, *Physica*, I. ix. 30.

Newtonus[42] passim nec obscure innuit, non solummodo motum ab initio a numine profectum esse, verum adhuc systema mundanum ab eodem actu moveri. Hoc sacris literis consonum est: hoc scholasticorum calculo comprobatur. Nam etsi Peripatetici naturam tradant esse principium motus et quietis, interpretantur tamen naturam naturantem esse Deum[43]. Intelligunt nimirum corpora omnia systematis hujusce mundani a mente præpotenti juxta certam et constantem rationem[44] moveri.

33. Cæterum qui principium vitale corporibus tribuunt, obscurum aliquid et rebus parum conveniens fingunt. Quid enim aliud est vitali principio præditam esse quam vivere? aut vivere quam se movere, sistere, et statum suum mutare? Philosophi autem hujus sæculi doctissimi pro principio indubitato ponunt, omne corpus perseverare in statu suo, vel quietus vel motus uniformis in directum, nisi quatenus aliunde cogitur statum illum mutare: e contrario, in anima sentimus esse facultatem tam statum suum quam aliarum rerum mutandi; id quod proprie dicitur vitale, animamque a corporibus longe discriminat.

34. Motum et quietem in corporibus recentiores considerant velut duos status existendi, in quorum utrovis corpus omne sua natura iners permaneret[45], nulla vi externa urgente. Unde colligere licet, eandem esse causam motus et quietis, quæ est existentiæ corporum. Neque enim quærenda videtur alia causa existentiæ corporis successivæ in diversis partibus spatii, quam illa unde derivatur existentia ejusdem corporis successiva in diversis partibus temporis. De Deo autem Optimo Maximo rerum omnium Conditore et Conservatore tractare, et qua ratione res cunctæ a summo et vero Ente pendeant demonstrare, quamvis pars sit scientiæ humanæ præcellentissima, spectat tamen potius ad philosophiam primam seu metaphysicam et theologiam, quam ad philosophiam naturalem[46], quæ hodie fere omnis continetur in experimentis et

[42] *Principia Mathematica*—Scholium Generale.

[43] 'naturam naturantem esse Deum'—i. e. God considered as the imminent cause of the universe. See St. Thomas Aquinas, *Opera*, vol. XXII. Quest. 6, p. 27.

[44] 'juxta certam et constantem rationem'—i.e. while the changes in matter are determined by will, it is not a capricious but a rational will. The very arbitrariness of the Language of Nature is relative to us, and from our point of view. In itself, the physical universe is the expression of Absolute Reason.

[45] 'permaneret.' Cf. sect. 51.

[46] 'spectat potius ad philosophiam primam seu metaphysicam et theologiam, quam ad philosophiam naturalem.' The drift of the essay *De Motu* is to distinguish the merely physical sciences of phenomena from the faith in an originating Cause with which the spiritual students of Metaphysics and Theology are conversant.

mechanica. Itaque cognitionem de Deo vel supponit philosophia naturalis, vel mutuatur ab aliqua scientia superiori. Quanquam verissimum sit, naturæ investigationem scientiis altioribus argumenta egregia ad sapientiam, bonitatem, et potentiam Dei illustrandam et probandam undequaque subministrare.

35. Quod hæc minus intelligantur, in causa est, cur nonnulli immerito repudient physicæ principia mathematica, eo scilicet nomine quod illa causas rerum efficientes non assignant: quum tamen revera ad physicam aut mechanicam spectet regulas [47] solummodo, non causas efficientes, impulsionum attractionumve, et ut verbo dicam, motuum leges tradere; ex iis vero positis phænomenon particularium solutionem [47], non autem causam efficientem assignare.

36. Multum intererit [48] considerasse quid proprie sit principium, et quo sensu intelligenda sit vox illa apud philosophos. Causa quidem vera efficiens et conservatrix rerum omnium jure optimo appellatur fons et principium earundem. Principia vero philosophiæ experimentalis proprie dicenda sunt fundamenta quibus illa innititur, seu fontes unde derivatur, (non dico existentia, sed) cognitio rerum corporearum, sensus utique ex experientia. Similiter, in philosophia mechanica, principia dicenda sunt, in quibus fundatur et continetur universa disciplina, leges illæ motuum primariæ, quæ experimentis comprobatæ, ratiocinio etiam excultæ sunt et redditæ universales [49]. Hæ motuum leges commode dicuntur principia, quoniam ab iis tam theoremata mechanica generalia quam particulares *τῶν φαινομένων* explicationes derivantur.

37. Tum nimirum dici potest quidpiam explicari mechanice, cum reducitur ad ista principia simplicissima et universalissima, et per accuratum ratiocinium, cum iis consentaneum et connexum esse ostenditur. Nam inventis semel naturæ legibus, deinceps

[47] 'regulas'—'solutionem.' Cf. *Siris*, sect. 231—235.

[48] 'multum intererit.' Having, in the preceding sections, contrasted sensible motions and their efficient cause—matter and mind—physics and metaphysics, Berkeley proceeds in this and the seven following sections to explain what he means by origin (*principium*), and the two meanings (metaphysical and mechanical) of *solutio*. By the real source and origin of things he understands their efficient and preserving cause. In natural philosophy the term is applied to law or order manifested in effects, and not to causes proper at all.

[49] 'experimentis comprobatæ, ratiocinio etiam excultæ sunt et redditæ universales.' The relations in knowledge of the facts given in the senses to the universalizing reason are here recognized.

monstrandum est philosopho, ex constanti harum legum observatione, hoc est, ex iis principiis phænomenon quodvis necessario consequi: id quod est phænomena explicare et solvere, causamque, id est rationem cur fiant, assignare.

38. Mens humana gaudet scientiam suam extendere et dilatare. Ad hoc autem notiones et propositiones generales efformandæ sunt, in quibus quodam modo continentur propositiones et cognitiones particulares, quæ tum demum intelligi creduntur cum ex primis illis continuo nexu deducuntur. Hoc geometris notissimum est. In mechanica etiam præmittuntur notiones, hoc est definitiones, et enunciationes de motu primæ et generales, ex quibus postmodum methodo mathematica conclusiones magis remotæ et minus generales colliguntur. Et sicut per applicationem theorematum geometricorum, corporum particularium magnitudines mensurantur; ita etiam per applicationem theorematum mechanices universalium, systematis mundani partium quarumvis motus, et phænomena inde pendentia, innotescunt et determinantur: ad quem scopum unice collineandum physico.

39. Et quemadmodum geometræ, disciplinæ causa, multa comminiscuntur, quæ nec ipsi describere possunt, nec in rerum natura invenire; simili prorsus ratione mechanicus voces quasdam abstractas et generales adhibet, fingitque in corporibus *vim*, *actionem*, *attractionem*, *solicitationem*, &c. quæ ad theorias et enunciationes, ut et computationes de motu apprime utiles sunt, etiamsi in ipsa rerum veritate et corporibus actu existentibus frustra quærerentur, non minus quam quæ a geometris per abstractionem mathematicam finguntur.

40. Revera ope sensuum nil nisi effectus seu qualitates sensibiles, et res corporeas omnino passivas, sive in motu sint sive in quiete, percipimus: ratioque et experientia activum nihil præter mentem aut animam esse suadet. Quicquid ultra fingitur, id ejusdem generis esse cum aliis hypothesibus et abstractionibus mathematicis existimandum: quod penitus animo infigere oportet. Hoc ni fiat, facile in obscurum scholasticorum subtilitatem, quæ per tot sæcula, tanquam dira quædam pestis, philosophiam corrupit, relabi possumus.

41. Principia mechanica legesque motuum aut naturæ universales, sæculo ultimo feliciter inventæ, et subsidio geometriæ tractatæ et applicatæ, miram lucem in philosophiam intulerunt.

Principia vero metaphysica causæque reales efficientes motus et existentiæ corporum attributorumve corporeorum nullo modo ad mechanicam aut experimenta pertinent; neque eis lucem dare possunt, nisi quatenus, velut præcognita inserviant ad limites physicæ præfiniendos, eaque ratione ad tollendas difficultates quæstionesque peregrinas.

42. Qui a spiritibus motus principium petunt, ii vel rem corpoream vel incorpoream voce *spiritus* intelligunt. Si rem corpoream, quantumvis tenuem, tamen redit difficultas: si incorpoream, quantumvis id verum sit, attamen ad physicam non proprie pertinet. Quod si quis philosophiam naturalem ultra limites experimentorum et mechanicæ extenderit, ita ut rerum etiam incorporearum, et inextensarum cognitionem complectatur, latior quidem illa vocis acceptio tractationem de anima, mente, seu principio vitali admittit. Cæterum commodius erit, juxta usum jam fere receptum, ita distinguere inter scientias, ut singulæ propriis circumscribantur cancellis, et philosophus naturalis totus sit in experimentis, legibusque motuum, et principiis mechanicis, indeque depromptis ratiociniis; quidquid autem de aliis rebus protulerit, id superiori alicui scientiæ acceptum referat. Etenim ex cognitis naturæ legibus pulcherrimæ theoriæ, praxes etiam mechanicæ ad vitam utiles consequuntur. Ex cognitione autem ipsius naturæ Auctoris considerationes longe præstantissimæ quidem illæ, sed metaphysicæ, theologicæ, morales oriuntur.

43. De *principiis* hactenus: nunc dicendum de *natura* motus[50]. Atque is quidem, cum sensibus clare percipiatur, non tam natura sua, quam doctis philosophorum commentis obscuratus est. Motus nunquam in sensus nostros incurrit sine mole corporea, spatio, et tempore. Sunt tamen qui motum, tanquam ideam quandam simplicem et abstractam, atque ab omnibus aliis rebus sejunctam, contemplari student. Verum idea illa tenuissima et subtilissima[51]

[50] 'natura motus.' Sect. 43—66 treat of the nature of the *effect*—sensible motion, as distinguished from its true cause or origin (*principium*)—mind or spirit. As the origin of motion belongs to Metaphysics, the nature or definition of motion, constituted by the laws of its sensible phenomena, belongs to Mechanics or Physics. A true definition of motion is what Berkeley is in search of in this second part of the *De Motu*. Cf. *Principles of Human Knowledge*, sect. 111—116.

[51] 'idea illa tenuissima et subtilissima.' Here again the difficulty is attributed to abstractions, and to the inclination of the scholastic mind to prefer these to the concrete motions of which we have sensible experience, and which may be universalized by reason.

intellectus aciem eludit: id quod quilibet secum meditando experiri potest. Hinc nascuntur magnæ difficultates de natura motus, et definitiones, ipsa re quam illustrare debent longe obscuriores. Hujusmodi sunt definitiones illæ Aristotelis et Scholasticorum[52], qui motum dicunt esse *actum mobilis quatenus est mobile, vel actum entis in potentia quatenus in potentia.* Hujusmodi etiam est illud viri[53] inter recentiores celebris, qui asserit *nihil in motu esse reale præter momentaneum illud quod in vi ad mutationem nitente constitui debet.* Porro constat, horum et similium definitionum auctores in animo habuisse abstractam motus naturam, seclusa omni temporis et spatii consideratione, explicare: sed qua ratione abstracta illa motus quintessentia (ut ita dicam) intelligi possit, non video.

44. Neque hoc contenti. Ulterius pergunt, partesque ipsius motus a se invicem dividunt et secernunt, quarum ideas distinctas, tanquam entium revera distinctorum, efformare conantur. Etenim sunt qui motionem a motu distinguant, illam velut instantaneum motus elementum spectantes. Velocitatem insuper, conatum, vim, impetum totidem res essentia diversas esse volunt, quarum quæque per propriam atque ab aliis omnibus segregatam et abstractam ideam intellectui objiciatur. Sed in hisce rebus discutiendis, stantibus iis quæ supra disseruimus[54], non est cur diutius immoremur.

45. Multi etiam per *transitum*[55] motum definiunt, obliti, scilicet, transitum ipsum sine motu intelligi non posse, et per motum definiri oportere. Verissimum adeo est definitiones, sicut nonnullis rebus lucem, ita vicissim aliis tenebras afferre. Et profecto, quascumque res sensu percipimus, eas clariores aut notiores definiendo efficere vix quisquam potuerit. Cujus rei vana spe allecti res faciles difficillimas[56] reddiderunt philosophi, mentesque suas difficultatibus, quas ut plurimum ipsi peperissent, implicavere. Ex hocce definiendi, simul ac abstrahendi studio, multæ tam de motu quam de aliis rebus natæ subtilissimæ quæstiones, eædemque nullius utilitatis, hominum ingenia frustra torserunt; adeo ut Aristoteles ultro et sæpius fateatur motum esse *actum quendam*

[52] Motion is thus defined by Aristotle:—*Φημὲν δὴ τὴν κίνησιν εἶναι ἐντελέχειαν τοῦ κινητοῦ ᾗ κινητὸν. Nat. Ausc.* III. ii.; see also i. and iii. See also Derodon, *Physica*, I. ix.

[53] Newton.

[54] Cf. sect. 3—42.

[55] Des Cartes, *Principia*, P. II. § 25; also Borellus, *De Vi Percussionis*, p. 1.

[56] 'res faciles difficillimas.' Cf. *Principles*, 'Introduction,' sect. 1.

cognitu difficilem[57], et nonnulli ex veteribus usque eo nugis exercitati deveniebant, ut motum omnino esse negarent[58].

46. Sed hujusmodi minutiis distineri piget. Satis sit fontes solutionum indicasse: ad quos etiam illud adjungere libet: quod ea quæ de infinita divisione temporis et spatii in mathesi traduntur, ob congenitam rerum naturam paradoxa et theorias spinosas (quales sunt illæ omnes in quibus agitur de infinito[59]) in speculationes de motu intulerunt. Quidquid autem hujus generis sit, id omne motus commune habet cum spatio et tempore, vel potius ad ea refert acceptum.

47. Et quemadmodum ex una parte nimia abstractio seu divisio rerum vere inseparabilium, ita ab altera parte compositio seu potius confusio rerum diversissimarum motus naturam perplexam reddidit. Usitatum enim est motum cum causa motus efficiente confundere[60]. Unde accidit ut motus sit quasi biformis, unam faciem sensibus, obviam, alteram caliginosa nocte obvolutam habens. Inde obscuritas et confusio, et varia de motu paradoxa originem trahunt, dum effectui perperam tribuitur id quod revera causæ solummodo competit.

48. Hinc oritur opinio illa, eandem semper motus quantitatem conservari[61]; quod, nisi intelligatur de vi et potentia causæ, sive causa illa dicatur natura, sive *νοῦς*, vel quodcunque tandem agens sit, falsum esse cuivus facile constabit. Aristoteles[62] quidem l. 8. Physicorum, ubi quærit *utrum motus factus sit et corruptus, an vero ab æterno tanquam vita immortalis insit rebus omnibus*, vitale principium potius, quam effectum externum, sive mutationem loci[63] intellexisse videtur.

49. Hinc etiam est, quod multi suspicantur motum non esse meram passionem in corporibus. Quod si intelligamus id quod in motu corporis sensibus objicitur, quin omnino passivum sit nemo dubitare potest. Ecquid enim in se habet successiva corporis existentia in diversis locis, quod actionem referat, aut aliud sit quam nudus et iners effectus?

[57] Καὶ διὰ τοῦτο δὴ χαλεπὸν αὐτὴν λαβεῖν τί ἐστιν. *Nat. Ausc.* III. i.

[58] e.g. Zeno.

[59] 'de infinito, &c.' Cf. *Principles*, sect. 130—132, and the *Analyst* passim, for Berkeley's theory of infinitesimals.

[60] 'confundere.' Cf. sect. 3—42 in illustration of this confusion.

[61] The modern doctrine of the 'conservation of force.'

[62] Aristotle states the question *Nat. Ausc.* VIII. cap. i., and solves it in cap. iv.

[63] 'mutatio loci' is the effect, i.e. motion proper; 'vitale principium' the efficient cause, i.e. vital and personal agency.

50. Peripatetici, qui dicunt motum esse actum unum utriusque, moventis et moti[64], non satis discriminant causam ab effectu. Similiter, qui nisum aut conatum in motu fingunt, aut idem corpus simul in contrarias partes ferri putant, eadem idearum confusione, eadem vocum ambiguitate ludificari videntur.

51. Juvat multum, sicut in aliis omnibus, ita in scientia de motu accuratam diligentiam adhibere, tam ad aliorum conceptus intelligendos quam ad suos enunciandos: in qua re nisi peccatum esset, vix credo in disputationem trahi potuisse, utrum corpus indifferens sit ad motum et ad quietem, necne. Quoniam enim experientia constat, esse legem naturæ primarium, ut corpus perinde perseverat in *statu motus ac quietis, quamdiu aliunde nihil accidat ad statum istum mutandum*; et propterea vim inertiæ sub diverso respectu esse vel resistentiam, vel impetum, colligitur: hoc sensu profecto corpus dici potest sua natura indifferens ad motum vel quietem. Nimirum tam difficile est quietem in corpus motum, quam motum in quiescens inducere: cum vero corpus pariter conservet statum utrumvis, quidni dicatur ad utrumvis se habere indifferenter?

52. Peripatetici pro varietate mutationum, quas res aliqua subire potest, varia motus genera distinguebant.—Hodie de motu agentes intelligunt solummodo *motum localem*[65]. Motus autem localis intelligi nequit nisi simul intelligatur quid sit *locus:* is vero a neotericis[66] definitur *pars spatii quam corpus occupat:* unde dividitur in relativum et absolutum pro ratione spatii. Distinguunt enim inter spatium absolutum sive verum, ac relativum sive apparens. Volunt scilicet dari spatium undequaque immensum, immobile, insensibile, corpora universa permeans et continens, quod vocant spatium absolutum. Spatium autem a corporibus comprehensum vel definitum, sensibusque adeo subjectum, dicitur spatium relativum, apparens vulgare.

53. Fingamus itaque corpora cuncta destrui, et in nihilum

[64] 'moventis et moti,' i.e. as concauses.

[65] 'motum localem.' Sect. 52–65 discuss the alleged distinctions of real or absolute and apparent or relative motion, and of real or absolute and apparent or relative space. The abstract impossibility of absolute space and motion is argued. With Berkeley space is identified with sensible extension; and so-called absolute space is mere negation. Cf. *Principles*, sect. 116, 117. See Locke's *Essay*, Bk. II. ch. 13; *Correspondence* between Clarke and Leibnitz; and Newton's *Principia*.

[66] Newton's *Principia*, Def. Sch. III. See also Derodon, *Physica*, P. I. cap. vi. § 1.

redigi. Quod reliquum est vocant spatium absolutum, omni relatione quæ a situ et distantiis corporum oriebatur, simul cum ipsis corporibus, sublata. Porro spatium illud est infinitum, immobile, indivisibile, insensibile, sine relatione et sine distinctione. Hoc est, omnia ejus attributa sunt privativa vel negativa: videtur igitur esse merum nihil[67]. Parit solummodo difficultatem aliquam quod extensum sit. Extensio autem est qualitas positiva. Verum qualis tandem extensio est illa quæ nec dividi potest, nec mensurari, cujus nullam partem, nec sensu percipere, nec imaginatione depingere possumus? Etenim nihil in imaginationem cadit, quod, ex natura rei, non possibile est ut sensu percipiatur; siquidem *imaginatio*[68] nihil aliud est quam facultas representatrix rerum sensibilium, vel actu existentium, vel saltem possibilium. Fugit insuper *intellectum purum*[68], quum facultas illa versetur tantum circa res spirituales et inextensas, cujusmodi sunt mentes nostræ, earumque habitus, passiones, virtutes, et similia. Ex spatio igitur absoluto auferamus modo vocabula, et nihil remanebit in sensu, imaginatione, aut intellectu: nihil aliud ergo iis designatur, quam pura privatio aut negatio, hoc est, merum nihil.

54. Confitendum omnino est nos circa hanc rem gravissimis præjudiciis teneri, a quibus ut liberemur, omnis animi vis exercenda. Etenim multi, tantum abest quod spatium absolutum pro nihilo ducant, ut rem esse ex omnibus (Deo excepto) unicam existiment, quæ annihilari non possit: statuantque illud suapte natura necessario existere, æternumque esse et increatum, atque adeo attributorum divinorum particeps[69]. Verum enimvero quum certissimum sit, res omnes, quas nominibus designamus, per qualitates aut relationes, vel aliqua saltem ex parte cognosci (ineptum enim foret vocabulis uti quibus cogniti nihil, nihil notionis, ideæ vel conceptus subjiceretur), inquiramus diligenter, utrum formare liceat *ideam* ullam spatii illius puri, realis, absoluti, quod post omnium corporum annihilationem perseveret existere. Ideam porro talem paulo acrius intuens, reperio ideam esse nihili purissimam, si modo idea appellanda sit. Hoc ipse summa adhibita diligentia expertus sum: hoc alios pari adhibita diligentia experturos reor.

[67] Cf. Locke's account of absolute space, *Essay*, Bk. II. ch. 13, 15, 17.

[68] Note the definitions here given of *imagination* and *intellect*, as distinguished from *sense*, which may be compared with the αἴσθησις, φαντασία, and νοῦς of Aristotelian psychology.

[69] 'attributorum divinorum particeps.' Dr. Samuel Clarke, for instance, in his *Demonstration*.

55. Decipere nos nonnunquam solet, quod aliis omnibus corporibus imaginatione sublatis, *nostrum*[70] tamen manere supponimus. Quo supposito, motum membrorum ab omni parte liberrimum imaginamur. Motus autem sine spatio concipi non potest. Nihilominus si rem attento animo recolamus, constabit primo concipi spatium relativum partibus nostri corporis definitum: 2°. movendi membra potestatem liberrimam nullo obstaculo retusam: et præter hæc duo nihil. Falso tamen credimus tertium aliquod, spatium videlicet immensum realiter existere, quod liberam potestatem nobis faciat movendi corpus nostrum: ad hoc enim requiritur absentia solummodo aliorum corporum. Quam absentiam, sive privationem corporum, nihil esse positivum fateamur necesse est[71].

56. Cæterum hasce res nisi quis libero et acri examine perspexerit, verba et voces parum valent. Meditanti vero, et rationes secum reputanti, ni fallor, manifestum erit, quæcunque de spatio puro et absoluto prædicantur, ea omnia de nihilo prædicari posse. Qua ratione mens humana facillime liberatur a magnis difficultatibus simulque ab ea absurditate tribuendi existentiam necessariam[72] ulli rei præterquam soli Deo optimo maximo.

57. In proclivi esset sententiam nostram argumentis a posteriori (ut loquuntur) ductis confirmare, quæstiones de spatio absoluto proponendo; exempli gratia, utrum sit substantia vel accidens? utrum creatum vel increatum? et absurditates ex utravis parte consequentes demonstrando. Sed brevitati consulendum. Illud tamen omitti non debet, quod sententiam hancce Democritus olim calculo suo comprobavit, uti auctor est Aristoteles l. i. Phys. ubi hæc habet: *Democritus solidum et inane ponit principia, quorum aliud quidem ut quod est, aliud ut quod non est esse dicit.* Scrupulum si forte injiciat, quod distinctio illa inter spatium absolutum et relativum a magni nominis philosophis usurpetur, eique quasi fundamento inædificentur multa præclara theoremata, scrupulum istum vanum esse, ex iis quæ secutura sunt, apparebit.

58. Ex præmissis patet, non convenire, ut definiamus locum verum corporis esse partem spatii absoluti quam occupat corpus,

[70] 'nostrum,' sc. corpus.

[71] [Vide quæ contra spatium absolutum disseruntur in libro *De Principiis Cognitionis Humanæ*, idiomate anglicano decem abhinc annis edito.]—Author. He refers to sect. 116 of the *Principles*.

[72] Pure space being a mere negation, and sensible space a manifestation and product of Supreme Rational Will.

motumque verum seu absolutum esse mutationem loci veri et absoluti. Siquidem omnis locus est relativus, ut et omnis motus. Veruntamen ut hoc clarius appareat, animadvertendum est, motum nullum intelligi posse sine determinatione aliqua seu directione, quæ quidem intelligi nequit, nisi præter corpus motum, nostrum etiam corpus, aut aliud aliquod, simul intelligatur existere. Nam sursum, deorsum, sinistrorsum, dextrorsum, omnesque plagæ et regiones in relatione aliqua fundantur, et necessario corpus a moto diversum connotant et supponunt. Adeo ut, si reliquis corporibus in nihilum redactis, globus, exempli gratia, unicus existere supponatur; in illo motus nullus concipi possit: usque adeo necesse est, ut detur aliud corpus, cujus situ motus determinari intelligatur. Hujus sententiæ veritas clarissime elucebit, modo corporum omnium tam nostri quam aliorum, præter globum istum unicum, annihilationem recte supposuerimus.

59. Concipiantur porro duo globi, et præterea nil corporeum, existere. Concipiantur deinde vires quomodocunque applicari: quicquid tandem per applicationem virium intelligamus, motus circularis duorum globorum circa commune centrum nequit per imaginationem concipi. Supponamus deinde cœlum fixarum creari: subito ex concepto appulsu globorum ad diversas cœli istius partes motus concipietur. Scilicet cum motus natura sua sit relativus, concipi non potuit priusquam darentur corpora correlata. Quemadmodum nec ulla relatio alia sine correlatis concipi potest.

60. Ad motum circularem quod attinet, putant multi, crescente motu vero circulari, corpus necessario magis semper magisque ab axe niti. Hoc autem ex eo provenit, quod, cum motus circularis spectari possit tanquam in omni momento a duabus directionibus ortum trahens, una secundum radium, altera secundum tangentem; si in hac ultima tantum directione impetus augeatur, tum a centro recedet corpus motum, orbita vero desinet esse circularis. Quod si æqualiter augeantur vires in utraque directione, manebit motus circularis, sed acceleratus conatu, qui non magis arguet vires recedendi ab axe, quam accedendi ad eundem, auctas esse. Dicendum igitur, aquam in situla circumactam ascendere ad latera vasis, propterea quod, applicatis novis viribus in directione tangentis ad quamvis particulam aquæ, eodem instanti non applicentur novæ vires æquales centripetæ. Ex quo experi-

mento nullo modo sequitur, motum absolutum circularem per vires recedendi ab axe motus necessario dignosci. Porro qua ratione intelligendæ sunt voces istæ, *vires corporum et conatus*, ex præmissis satis superque innotescit.

61. Quo modo curva considerari potest tanquam constans ex rectis infinitis, etiamsi revera ex illis non constet, sed quod ea hypothesis ad geometriam utilis sit eodem modo motus circularis spectari potest tanquam a directionibus rectilineis infinitis ortum ducens, quæ suppositio utilis est in philosophia mechanica. Non tamen ideo affirmandum, impossibile esse, ut centrum gravitatis corporis cujusvis successive existat in singulis punctis peripheriæ circularis, nulla ratione habita directionis ullius rectilineæ, sive in tangente sive in radio.

62. Haud omittendum est, motum lapidis in funda, aut aquæ in situla circumacta, dici non posse motum vere circularem, juxta mentem eorum qui per partes spatii absoluti definiunt loca vera corporum; cum sit mire compositus ex motibus non solum situlæ vel fundæ, sed etiam telluris diurno circa proprium axem, menstruo circa commune centrum gravitatis terræ et lunæ, et annuo circa solem: et propterea particula quævis lapidis vel aquæ describat lineam a circulari longe abhorrentem. Neque revera est, qui creditur, conatus axifugus, quoniam non respicit unum aliquem axem ratione spatii absoluti, supposito quod detur tale spatium: proinde non video quomodo appellari possit conatus unicus, cui motus vere circularis tanquam proprio et adequato effectui respondit.

63. Motus nullus dignosci potest, aut mensurari, nisi per res sensibiles. Cum ergo spatium absolutum nullo modo in sensus incurrat, necesse est ut inutile prorsus sit ad distinctionem motuum. Præterea determinatio sive directio motui essentialis est, illa vero in relatione consistit. Ergo impossibile est ut motus absolutus concipiatur.

64. Porro quoniam pro diversitate loci relativi varius sit motus ejusdem corporis, quinimo uno respectu moveri, altero quiescere dici quidpiam possit[73]; ad determinandum motum verum et quietem veram, quo scilicet tollatur ambiguitas, et consulatur mechanicæ philosophorum, qui systema rerum latius contemplantur, satis

[73] See Locke, *Essay*, Bk. II. ch. 13, § 7—10.

fuerit spatium relativum fixarum cœlo, tanquam quiescente spectato, conclusum adhibere, loco spatii absoluti. Motus autem et quies tali spatio relativo definiti, commode adhiberi possunt loco absolutorum, qui ab illis nullo symptomate discerni possunt. Etenim imprimantur utcunque vires, sint quicunque conatus, concedamus motum distingui per actiones in corpora exercitas; nunquam tamen inde sequetur, dari spatium illud et locum absolutum, ejusque mutationem esse locum verum.

65. Leges motuum, effectusque, et theoremata eorundem proportiones et calculos continentia, pro diversis viarum figuris, accelerationibus itidem et directionibus diversis, mediisque plus minusve resistentibus, hæc omnia constant sine calculatione motus absoluti. Uti vel ex eo patet quod, quum secundum illorum principia qui motum absolutum inducunt, nullo symptomate scire liceat, utrum integra rerum compages quiescat, an moveatur uniformiter in directum, perspicuum sit motum absolutum nullius corporis cognosci posse.

66. Ex dictis patet ad veram motus naturam perspiciendam summopere juvaturum, 1°. Distinguere inter hypotheses mathematicas et naturas rerum: 2°. Cavere ab abstractionibus: 3°. Considerare motum tanquam aliquid sensibile, vel saltem imaginabile; mensurisque relativis esse contentos. Quæ si fecerimus, simul clarissima quæque philosophiæ mechanicæ theoremata, quibus reserantur naturæ recessus, mundique systema calculis humanis subjicitur, manebunt intemerata, et motus contemplatio a mille minutiis, subtilitatibus, ideisque abstractis libera evadet. Atque hæc de natura motus dicta sufficiant.

67. Restat, ut disseramus de causa communicationis motuum[74]. Esse autem vim impressam in corpus mobile causam motus in eo, plerique existimant. Veruntamen illos non assignare causam motus cognitam, et a corpore motuque distinctam, ex præmissis

[74] Sect. 67—72 treat of the cause of the transmission of motion among bodies. While this is held to be, strictly speaking, the active Intelligence which moves and embraces the whole material universe, nevertheless, for the purposes of merely natural philosophy, explanations of phenomena may be deduced from mechanical principles. Cf. *Siris*, sect. 252, 253, in which an interpretation of physical signs, sufficient for prevision, is allowed to be an explanation of them.

constat. Patet insuper vim non esse rem certam et determinatam, ex eo quod viri summi de illa multum diversa, immo contraria, proferant, salva tamen in consequentiis veritate. Siquidem Newtonus[75] ait vim impressam consistere in actione sola, esseque actionem exercitam in corpus ad statum ejus mutandum, nec post actionem manere. Torricellius[76] cumulum quendam sive aggregatum virium impressarum per percussionem in corpus mobile recipi, ibidemque manere atque impetum constituere contendit. Idem fere Borellus[77] aliique prædicant. At vero, tametsi inter se pugnare videantur Newtonus et Torricellius, nihilominus, dum singuli sibi consentanea proferunt, res satis commode ab utrisque explicatur. Quippe vires omnes corporibus attributæ tam sunt hypotheses mathematicæ quam vires attractivæ in planetis et sole. Cæterum entia mathematica in rerum natura stabilem essentiam non habent: pendent autem a notione definientis; unde eadem res diversimode explicari potest.

68. Statuamus motum novum in corpore percusso conservari, sive per vim insitam, qua corpus quodlibet perseverat in statu suo vel motus vel quietis uniformis in directum; sive per vim impressam, durante percussione in corpus percussum receptam ibidemque permanentem; idem erit quoad rem, differentia existente in nominibus tantum. Similiter, ubi mobile percutiens perdit, et percussum acquirit motum, parum refert disputare, utrum motus acquisitus sit idem numero cum motu perdito, ducit enim in minutias metaphysicas et prorsus nominales de identitate. Itaque sive dicamus motum transire a percutiente in percussum, sive in percusso motum de novo generari, destrui autem in percutiente, res eodem recidit. Utrobique intelligitur unum corpus motum perdere, alterum acquirere, et præterea nihil.

69. Mentem, quæ agitat et continet universam hancce molem corpoream, estque causa vera efficiens motus, eandem esse, proprie et stricte loquendo, causam communicationis ejusdem haud negaverim. In philosophia tamen physica, causas et solutiones phænomenon a principiis mechanicis petere oportet. Physice igitur res explicatur non assignando ejus causam vere agentem et incorpoream, sed demonstrando ejus connexionem cum principiis mechanicis: cujusmodi est illud, *actionem et reactionem esse*

[75] *Principia*, Def. IV. [76] *Lezioni Accademiche.*
[77] *De Vi Percussionis*, cap. IX.

semper contrarias et æquales[78], a quo, tanquam fonte et principio primario, eruuntur regulæ de motuum communicatione, quæ a neotericis, magno scientiarum bono, jam ante repertæ sunt et demonstratæ.

70. Nobis satis fuerit, si innuamus principium illud alio modo declarari potuisse. Nam si vera rerum natura potius quam abstracta mathesis spectetur, videbitur rectius dici, in attractione vel percussione passionem corporum, quam actionem, esse utrobique æqualem. Exempli gratia, lapis fune equo alligatus tantum trahitur versus equum, quantum equus versus lapidem: corpus etiam motum in aliud quiescens impactum, patitur eandem mutationem cum corpore quiescente. Et quoad effectum realem, percutiens est item percussum, percussumque percutiens. Mutatio autem illa est utrobique, tam in corpore equi quam in lapide, tam in moto quam in quiescente, passio mera. Esse autem vim, virtutem, aut actionem corpoream talium effectuum vere et proprie causatricem non constat. Corpus motum in quiescens impingitur; loquimur tamen active, dicentes illud hoc impellere: nec absurde in mechanicis, ubi ideæ mathematicæ potius quam veræ rerum naturæ spectantur.

71. In physica, sensus et experientia, quæ ad effectus apparentes solummodo pertingunt, locum habent; in mechanica, notiones abstractæ mathematicorum admittuntur. In philosophia prima, seu metaphysica, agitur de rebus incorporeis, de causis, veritate, et existentia rerum. Physicus series sive successiones rerum sensibilium contemplatur, quibus legibus connectuntur, et quo ordine, quid præcedit tanquam causa, quid sequitur tanquam effectus, animadvertens. Atque hac ratione dicimus corpus motum esse causam motus in altero, vel ei motum imprimere, trahere etiam, aut impellere. Quo sensu causæ secundæ corporeæ intelligi debent, nulla ratione habita veræ sedis virium, vel potentiarum actricum, aut causæ realis cui insunt. Porro dici possunt causæ vel principia mechanica, ultra corpus, figuram, motum, etiam axiomata scientiæ mechanicæ primaria, tanquam causæ consequentium spectata.

72. Causæ vere activæ meditatione tantum et ratiocinio e tenebris erui quibus involvuntur possunt, et aliquatenus cognosci,

[78] This is Newton's third law of motion.

Spectat autem ad philosophiam primam, seu metaphysicam, de iis agere. Quod si cuique scientiæ provincia sua[79] tribuatur, limites assignentur, principia et objecta accurate distinguantur, quæ ad singulas pertinent, tractare licuerit majore, cum facilitate, tum perspicuitate.

[79] 'provincia sua.' The *De Motu* is a treatise on the theory of Physics, if, with Aristotle, we regard Physics as conversant about the manifestations of the principle of motion, in contrast to Mathematics, which deals with things immutable but not transcendent, and to Theology or Metaphysics, concerned with the eternal and transcendental. Berkeley treats of motion as the phenomenal expression of its Divine Cause —as the first link in the chain which connects the sensible and intelligible worlds, a conception unfolded more comprehensively in his *Siris*, more than twenty years afterwards. Cf. *Siris*. sect. 296, 297, 347—349.

MISCELLANEOUS WORKS.

ENGLISH.

PASSIVE OBEDIENCE:

OR,

THE CHRISTIAN DOCTRINE OF NOT RESISTING THE SUPREME POWER, PROVED AND VINDICATED,

UPON

THE PRINCIPLES OF THE LAW OF NATURE,

IN A DISCOURSE DELIVERED AT THE COLLEGE-CHAPEL,

1712.

TO THE READER.

THAT an absolute passive obedience ought not to be paid any civil power, but that submission to government should be measured and limited by the public good of the society; and that therefore subjects may lawfully resist the supreme authority, in those cases where the public good shall plainly seem to require it; nay, that it is their duty to do so, inasmuch as they are all under an indispensable obligation to promote the common interest:—these and the like notions, which I cannot help thinking pernicious to mankind, and repugnant to right reason, having of late years been industriously cultivated, and set in the most advantageous lights by men of parts and learning, it seemed necessary to arm the youth of our University against them, and take care they go into the world well principled;—I do not mean obstinately prejudiced in favour of a party, but, from an early acquaintance with their duty, and the clear rational grounds of it, determined to such practices as may speak them good Christians and loyal subjects.

In this view, I made three Discourses not many months since in the College-chapel[1], which some who heard them thought it might be of use to make more public: and, indeed, the false accounts[2] that are gone

[1] [Trinity College, Dublin.]—AUTHOR.

[2] The publication of the *Discourse* did not dispel these rumours, as we learn from the anecdote recorded by Bishop Stock. 'In 1712, the principles inculcated in Mr. Locke's *Two Treatises of Government* seem to have turned his attention to the doctrine of Passive Obedience; in support of which he printed the substance of three Commonplaces delivered by him that year in the College-chapel, a work which afterwards had nearly done him some injury in his fortune. For, being presented by Mr. [Samuel] Molyneux to their late Majesties, then Prince and Princess of Wales (whose Secretary Mr. Molyneux had been at Hanover), he was then recommended to Lord Galway for some preferment in the Church of Ireland. But Lord Galway having heard of these Sermons, represented him as a Jacobite; an impression which Mr. Molyneux, as soon as he was apprised of it, took care to remove from the minds of their Highnesses, by producing the work in question, and shewing that it contained nothing but principles of loyalty to the present happy Establishment.' (Stock's *Life of Berkeley*.)

abroad concerning them have made it necessary. Accordingly, I now send them into the world under the form of one entire Discourse.

To conclude: as in writing these thoughts it was my endeavour to preserve that cool and impartial temper which becomes every sincere inquirer after truth, so I heartily wish they may be read with the same disposition.

PASSIVE OBEDIENCE[1].

ROMANS, chap. xiii. ver. 2.

'Whosoever resisteth the Power, resisteth the ordinance of God.'

1. IT is not my design to enquire into the particular nature of the government and constitution of these kingdoms; much less to pretend to determine concerning the merits of the different parties now reigning in the state. Those topics I profess to lie out of my sphere, and they will probably be thought by most men improper to be treated of in an audience almost wholly made up of young persons, set apart from the business and noise of the

[1] The first two editions of this *Discourse* appeared in London in 1712. A third, 'corrected and enlarged,' followed in 1713, introducing, besides a few trifling verbal amendments, sect. 53, and the note to sect. 48.

The *Discourse* is interesting for its ingeniously-argued defence of Non-resistance as a duty opposed to the sin of lawlessness, but especially for the most distinct and reasoned account in Berkeley's writings of his general theory of moral obligation.

'Self-love' he represents (sect. 5) as the deepest and most universal motive of human action. We call actions *good* or *evil* as they are fitted to promote or hinder our own happiness. For distinguishing eternal good from present enjoyment, we must refer them, by means of reason, to universal law. Now, it is 'a truth evident by the light of nature, that there is a sovereign omniscient Spirit, who alone can make us for ever happy or for ever miserable.' (Sect. 6.) The universal laws of nature must, accordingly, be referred to the nature of God, and the end which He designs to accomplish by human actions. This end must be 'the good of men' (sect. 7), who are thus commanded to promote, by the 'concurring actions of each individual,' the 'general wellbeing of all men, of all nations, of all ages, of the world. The rational deduction of the goodness of actions is thus founded on their essential fitness to promote the wellbeing of mankind.'

Submission to the supreme authority is afterwards deduced as one of the most important consequences from these principles.

The chief divisions and subdivisions of the *Discourse* are unfolded in sect. 2, 3.

The same theory of the duty of absolute unlimited submission to supreme civil authority as a fundamental article of Ethics, is enforced in Berkeley's *Discourse to Magistrates*, published nearly a quarter of a century later, and which should be compared with this *Discourse*.

What follows may be compared with *Guardian*, No. 55, and *Alciphron*, Dial. II., III. See also Locke's *Treatises on Government*, published more than twenty years previously, as well as his suggestions of a theory of Ethics, and of a demonstrated method of forming Ethical Science, in his *Essay* and Correspondence with Molyneux.

world, for their more convenient instruction in learning and piety. But surely it is in no respect unsuitable to the circumstances of this place to inculcate and explain every branch of the Law of Nature; or those virtues and duties which are equally binding in every kingdom or society of men under heaven; and of this kind I take to be that Christian Duty of not resisting the supreme Power implied in my text—'Whosoever resisteth the Power, resisteth the ordinance of God.'

In treating on which words I shall observe the following method:—

2. First, I shall endeavour to prove that there is an absolute unlimited non-resistance or passive obedience due to the supreme civil power, wherever placed in any nation[2].

Secondly, I shall inquire into the grounds and reasons of the contrary opinion[3].

Thirdly, I shall consider the objections drawn from the pretended consequences of non-resistance to the supreme power[4].

In handling these points I intend not to build on the authority of Holy Scripture, but altogether on the principles of Reason common to all mankind; and that, because there are some very rational and learned men, who, being verily persuaded an absolute passive subjection to any earthly power is repugnant to right Reason, can never bring themselves to admit such an interpretation of Holy Scripture (however natural and obvious from the words) as shall make that a part of Christian religion which seems to them in itself manifestly absurd, and destructive of the original inherent rights of human nature.

3. I do not mean to treat of that submission which men are, either in duty or prudence, obliged to pay inferior or executive powers; neither shall I consider where or in what persons the supreme or legislative power is lodged in this or that government. Only thus much I shall take for granted—that there is in every civil community, somewhere or other, placed a supreme power

[2] Sect. 3—32. [3] Sect. 33—40. [4] Sect. 41—56.

of making laws, and enforcing the observation of them. The fulfilling of those laws, either by a punctual performance of what is enjoined in them, or, if that be inconsistent with reason or conscience, by a patient submission to whatever penalties the supreme power hath annexed to the neglect or transgression of them, is termed *loyalty*; as, on the other hand, the making use of force and open violence, either to withstand the execution of the laws, or ward off the penalties appointed by the supreme power, is properly named *rebellion*.

Now, to make it evident that every degree of rebellion is criminal in the subject, I shall, in the first place, endeavour to prove that loyalty is a natural or moral duty; and disloyalty, or rebellion, in the most strict and proper sense, a vice or breach of the law of nature. And, secondly, I propose to show that the prohibitions of vice, or negative precepts of the law of nature, as, 'Thou shalt not commit adultery, Thou shalt not forswear thyself, Thou shalt not resist the supreme power,' and the like, ought to be taken in a most absolute, necessary, and immutable sense: insomuch that the attainment of the greatest good, or deliverance from the greatest evil, that can befal any man or number of men in this life, may not justify the least violation of them.

First then, I am to show that loyalty is a Moral Duty, and disloyalty or rebellion, in the most strict and proper sense, a Vice, or breach of the Law of Nature[5].

4. Though it be a point agreed amongst all wise men, that there are certain moral rules or laws of nature, which carry with them an eternal and indispensable obligation; yet, concerning the proper methods for discovering those laws, and distinguishing them from others dependent on the humour and discretion of men, there are various opinions. Some direct us to look for them in the Divine Ideas; others in the natural inscriptions on the mind: some derive them from the authority of learned men, and the universal agreement and consent of nations. Lastly,

[5] Sect. 4—25.

others hold that they are only to be discovered by the deductions of reason. The three first methods must be acknowledged to labour under great difficulties; and the last has not, that I know, been anywhere distinctly explained, or treated of so fully as the importance of the subject doth deserve.

I hope therefore it will be pardoned, if, in a discourse of passive obedience, in order to lay the foundation of that duty the deeper, we make some inquiry into the origin, nature, and obligation of Moral Duties in general, and the criterions whereby they are to be known[6].

5. Self-love being a principle of all others the most universal, and the most deeply engraven in our hearts, it is natural for us to regard things as they are fitted to augment or impair our own happiness; and accordingly we denominate them *good* or *evil*. Our judgment is ever employed in distinguishing between these two, and it is the whole business of our lives to endeavour, by a proper application of our faculties, to procure the one and avoid the other. At our first coming into the world, we are entirely guided by the impressions of sense; sensible pleasure being the infallible characteristic of present good, as pain is of evil. But, by degrees, as we grow up in our acquaintance with the nature of things, experience informs us that present good is afterwards often attended with a greater evil; and, on the other side, that present evil is not less frequently the occasion of procuring to us a greater future good. Besides, as the nobler faculties of the human soul begin to display themselves, they discover to us goods far more excellent than those which affect the senses[7]. Hence an alteration is wrought in our judgments; we no longer comply with the first solicitations of sense, but stay to consider the remote consequences of an action—what good may be hoped, or what evil feared from it, according to the wonted course of

[6] In what follows (sect. 5—14), the rudiments of Berkeley's ethical doctrine of Theological or Ontological Utilitarianism are unfolded. Berkeley's eternal moral rules accord so far with Locke's hints of a demonstrative Ethics, while his motive of moral action coincides with that of Paley.

The later Idealism of Berkeley, as in *Siris*, presents more distinctly than in this *Discourse* the Eternal Law of Reason (by whatever method discovered) as the essence of morality.

[7] Cf. *Alciphron*, Dial. I. sect. 14—16; II. sect. 13—16.

things. This obliges us frequently to overlook present momentary enjoyments, when they come in competition with greater and more lasting goods—though too far off, or of too refined a nature to affect our senses.

6. But, as the whole earth, and the entire duration of those perishing things contained in it is altogether inconsiderable, or, in the prophet's expressive style, 'less than nothing' in respect of Eternity, who sees not that every reasonable man ought so to frame his actions as that they may most effectually contribute to promote his eternal interest? And, since it is a truth evident by the light of nature, that there is a sovereign omniscient Spirit, who alone can make us for ever happy, or for ever miserable; it plainly follows that a conformity to His will, and not any prospect of temporal advantage, is the sole rule whereby every man who acts up to the principles of Reason must govern and square his actions.—The same conclusion doth likewise evidently result from the relation which God bears to his creatures. God alone is maker and preserver of all things. He is, therefore, with the most undoubted right, the great legislator of the world; and mankind are, by all the ties of duty, no less than interest, bound to obey His laws.

7. Hence we should above all things endeavour to trace out the Divine will, or the general design of Providence with regard to mankind, and the methods most directly tending to the accomplishment of that design;—and this seems the genuine and proper way for discovering the laws of nature. For, laws being rules directive of our actions to the end intended by the legislator, in order to attain the knowledge of God's laws, we ought first to inquire what that end is which He designs should be carried on by human actions. Now, as God is a being of infinite goodness, it is plain the end He proposes is good. But, God enjoying in Himself all possible perfection, it follows that it is not His own good, but that of His creatures.—Again, the moral actions of men are entirely terminated within themselves, so as to have no influence on the other orders of intelligences or reasonable creatures; the end therefore to be procured by them can be no other than the good of men. But, as nothing in a natural state can entitle one man more than another to the favour of God, except only moral goodness; which, consisting in a conformity to the laws

of God, doth presuppose the being of such laws, and law ever supposing an end, to which it guides our actions—it follows that, antecedent to the end proposed by God, no distinction can be conceived between men; that end therefore itself, or general design of Providence, is not determined or limited by any respect of persons. It is not therefore the private good of this or that man, nation, or age, but the general well-being of all men, of all nations, of all ages of the world, which God designs should be procured by the concurring actions of each individual.

Having thus discovered the great end to which all moral obligations are subordinate, it remains that we inquire what methods are necessary for the obtaining that end.

8. The well-being of mankind must necessarily be carried on in one of these two ways:—either, first, without the injunction of any certain universal rules of morality, only by obliging every one, upon each particular occasion, to consult the public good, and always to do that which to him shall seem, in the present time and circumstances, most to conduce to it. Or, secondly, by enjoining the observation of some determinate, established laws, which, if universally practised, have, from the nature of things, an essential fitness to procure the well-being of mankind; though, in their particular application, they are sometimes, through untoward accidents, and the perverse irregularity of human wills, the occasions of great sufferings and misfortunes, it may be, to very many good men.

Against the former of these methods there lie several strong objections. For brevity I shall mention only two:—

9. First, it will thence follow that the best men, for want of judgment, and the wisest, for want of knowing all the hidden circumstances and consequences of an action, may very often be at a loss how to behave themselves;—which they would not be, in case they judged of each action by comparing it with some particular precept, rather than by examining the good or evil which in that single instance it tends to procure: it being far more easy to judge with certainty, whether such or such an action be a transgression of this or that precept, than whether it will be attended with more good or ill consequences. In short, to calculate the events of each particular action is impossible; and, though it were

not, would yet take up too much time to be of use in the affairs of life.

Secondly, if that method be observed, it will follow that we can have no sure standard to which, comparing the actions of another, we may pronounce them good or bad, virtues or vices. For, since the measure and rule of every good man's actions is supposed to be nothing else but his own private disinterested opinion of what makes most for the public good at that juncture; and, since this opinion must unavoidably in different men, from their particular views and circumstances, be very different: it is impossible to know, whether any one instance of parricide or perjury, for example, be criminal. The man may have had his reasons for it, and that which in me would have been a heinous sin may be in him a duty. Every man's particular rule is buried in his own breast, invisible to all but himself, who therefore can only tell whether he observes it or no. And, since that rule is fitted to particular occasions, it must ever change as they do: hence it is not only various in different men, but in one and the same man at different times.

10. From all which it follows, there can be no harmony or agreement between the actions of good men: no apparent steadiness or consistency of one man with himself, no adhering to principles: the best actions may be condemned, and the most villainous meet with applause. In a word, there ensues the most horrible confusion of vice and virtue, sin and duty, that can possibly be imagined. It follows, therefore, that the great end to which God requires the concurrence of human actions must of necessity be carried on by the second method proposed, namely, the observation of certain, universal, determinate rules or moral precepts, which, in their own nature, have a necessary tendency to promote the well-being of the sum of mankind, taking in all nations and ages, from the beginning to the end of the world.

11. Hence, upon an equal comprehensive survey of the general nature, the passions, interests, and mutual respects of mankind;—whatsoever practical proposition doth to right reason evidently appear to have a necessary connexion with the universal well-being included in it is to be looked upon as enjoined by the will of God. For, he that willeth the end doth will the necessary means conducive to that end; but it hath been shewn that God willeth

the universal well-being of mankind should be promoted by the concurrence of each particular person; therefore, every such practical proposition necessarily tending thereto is to be esteemed a decree of God, and is consequently a law to man.

12. These propositions are called *laws of nature*, because they are universal, and do not derive their obligation from any civil sanction, but immediately from the Author of nature himself. They are said to be *stamped on the mind*, to be *engraven on the tables of the heart*, because they are well known to mankind, and suggested and inculcated by conscience. Lastly, they are termed *eternal rules of reason*, because they necessarily result from the nature of things, and may be demonstrated by the infallible deductions of reason[8].

13. And, notwithstanding that these rules are too often, either by the unhappy concurrence of events, or more especially by the wickedness of perverse men who will not conform to them, made accidental causes of misery to those good men who do, yet this doth not vacate their obligation: they are ever to be esteemed the fixed unalterable standards of moral good and evil; no private interest, no love of friends, no regard to the public good, should make us depart from them. Hence, when any doubt arises concerning the morality of an action, it is plain this cannot be determined by computing the public good which in that particular case it is attended with, but only by comparing it with the Eternal Law of Reason. He who squares his actions by this rule can never do amiss, though thereby he should bring himself to poverty, death, or disgrace: no, not though he should involve his family, his friends, his country, in all those evils which are accounted the greatest and most insupportable to human nature. Tenderness and benevolence of temper are often motives to the best and greatest actions; but we must not make them the sole rule of our actions: they are passions rooted in our nature, and, like all other

[8] The Theological Utilitarianism of Berkeley here, as elsewhere, encourages this reference to 'eternal rules of reason,' and to the immutability, universality, and necessity of moral distinctions—language foreign to the purely secular and experiential utilitarian theory. His reverence for *law*, in contrast to empirical calculations by individuals of the personal utility of particular actions, is apparent in these passages. But if the criterion of these 'eternal laws' is their tendency to promote general happiness, a door is still open to the questions of casuistry, in the endeavour to determine and apply them. Cf. sect. 53.

passions, must be restrained and kept under, otherwise they may possibly betray us into as great enormities as any other unbridled lust. Nay, they are more dangerous than other passions, insomuch as they are more plausible, and apt to dazzle and corrupt the mind with the appearance of goodness and generosity[9].

14. For the illustration of what has been said, it will not be amiss, if from the moral we turn our eyes on the natural world. *Homo ortus est* (says Balbus in Cicero[10]) *ad mundum contemplandum, et imitandum.* And, surely, it is not possible for free intellectual agents to propose a nobler pattern for their imitation than Nature, which is nothing else but a series of free actions produced by the best and wisest Agent[11]. But, it is evident that those actions are not adapted to particular views, but all conformed to certain general rules, which, being collected from observation, are by philosophers termed laws of nature. And these indeed are excellently suited to promote the general well-being of the creation: but, what from casual combinations of events[12], and what from the voluntary motions[13] of animals, it often falls out, that the natural good not only of private men but of entire cities and nations would be better promoted by a particular suspension, or contradiction, than an exact observation of those laws. Yet, for all that, nature still takes its course; nay, it is plain that plagues, famines, inundations, earthquakes, with an infinite variety of pains and sorrows—in a word, all kinds of calamities public and private, do arise from a uniform steady observation of those General Laws, which are once established by the Author of nature, and which He will not change or deviate from upon any of those accounts, how wise or benevolent soever it may be thought by foolish men to do so. As for the miracles[14] recorded in Scripture, they were always wrought for confirmation of some doctrine or

[9] So Butler, who regards the benevolent affections as a subordinate part only of that ideal human nature to which our actions should conform. Benevolent motives may be springs of vicious actions.

[10] [*De Natura Deorum*, lib. ii. § 37.]—AUTHOR.

[11] In the second clause of this sentence we have in germ the essence of Berkeley's philosophy, according to which Nature, or the material universe, is simply a series of phenomena (*percipi* being their *esse*) which, in their uniform order of coexistence and succession, express Supreme Reason and Will. Cf. *Principles of Human Knowledge*, sect. 26—32; *Dialogues of Hylas and Philonous; De Motu; Theory of Vision Vindicated* passim; *Alciphron*, Dial. IV.; *Siris* passim.

[12] 'casual combinations of events.' What are they?

[13] 'voluntary motions,' i.e. the interruptions produced by finite agency or will.

[14] Cf. *Alciphron*, Dial. VI.; *Sermon before the S. P. G.*

mission from God, and not for the sake of the particular natural goods, as health or life, which some men might have reaped from them. From all which it seems sufficiently plain that we cannot be at a loss which way to determine, in case we think God's own methods the properest to obtain His ends, and that it is our duty to copy after them, so far as the frailty of our nature will permit.

15. Thus far in general, of the nature and necessity of Moral Rules, and the criterion or mark whereby they may be known.

As for the particulars, from the foregoing discourse, the principal of them may without much difficulty be deduced. It hath been shewn that the Law of Nature is a system of such rules or precepts as that, if they be all of them, at all times, in all places, and by all men observed, they will necessarily promote the well-being of mankind, so far as it is attainable by human actions. Now, let any one who hath the use of reason take but an impartial survey of the general frame and circumstances of human nature, and it will appear plainly to him that the constant observation of truth, for instance, of justice, and chastity hath a necessary connexion with their universal well-being; that, therefore, they are to be esteemed virtues or duties; and that 'Thou shalt not forswear thyself,' 'Thou shalt not commit adultery,' 'Thou shalt not steal,' are so many unalterable moral rules, which to violate in the least degree is vice or sin. I say, the agreement of these particular practical propositions with the definition or criterion premised doth so clearly result from the nature of things that it were a needless digression, in this place, to enlarge upon it.

And, from the same principle, by the very same reasoning, it follows that Loyalty is a moral virtue, and 'Thou shalt not resist the supreme power' a rule or law of nature, the least breach whereof hath the inherent stain of moral turpitude.

16. The miseries inseparable from a state of anarchy are easily imagined. So insufficient is the wit or strength of any single man, either to avert the evils, or procure the blessings of life, and so apt are the wills of different persons to contradict and thwart each other, that it is absolutely necessary several independent powers be combined together, under the direction (if I may so speak) of one and the same will—I mean the law of the

society. Without this there is no politeness, no order, no peace, among men, but the world is one great heap of misery and confusion; the strong as well as the weak, the wise as well as the foolish, standing on all sides exposed to all those calamities which man can be liable to in a state where he has no other security than the not being possessed of any thing which may raise envy or desire in another. A state by so much more ineligible than that of brutes as a reasonable creature hath a greater reflection and foresight of miseries than they. From all which it plainly follows, that loyalty, or submission to the supreme authority, hath, if universally practised in conjunction with all other virtues, a necessary connexion with the well-being of the whole sum of mankind; and, by consequence, if the criterion we have laid down be true, it is, strictly speaking, a moral duty, or branch of natural religion. And, therefore, the least degree of rebellion is, with the utmost strictness and propriety, a sin: not only in Christians, but also in those who have the light of reason alone for their guide. Nay, upon a thorough and impartial view, this submission will, I think, appear one of the very first and fundamental laws of nature; inasmuch as it is civil government which ordains and marks out the various relations between men, and regulates property, thereby giving scope and laying a foundation for the exercise of all other duties. And, in truth, whoever considers the condition of man will scarce conceive it possible that the practice of any one moral virtue should obtain, in the naked, forlorn state of nature.

17. But, since it must be confessed that in all cases our actions come not within the direction of certain fixed moral rules, it may possibly be still questioned, whether obedience to the supreme power be not one of those exempted cases, and consequently to be regulated by the prudence and discretion of every single person rather than adjusted to the rule of absolute non-resistance. I shall therefore endeavour to make it yet more plain, that 'Thou shalt not resist the supreme power' is an undoubted precept of morality; as will appear from the following considerations:—

First, then, submission to government is a point important enough to be established by a moral rule. Things of insignificant and trifling concern are, for that very reason, exempted from the rules

of morality. But government, on which so much depend the peace, order, and well-being, of mankind, cannot surely be thought of too small importance to be secured and guarded by a moral rule. Government, I say, which is itself the principal source under heaven of those particular advantages for the procurement and conservation whereof several unquestionable moral rules were prescribed to men.

18. Secondly, obedience to government is a case universal enough to fall under the direction of a law of nature. Numberless rules there may be for regulating affairs of great concernment, at certain junctures, and to some particular persons or societies, which, notwithstanding, are not to be esteemed moral or natural laws, but may be either totally abrogated or dispensed with;—because the private ends they were intended to promote respect only some particular persons, as engaged in relations not founded in the general nature of man, who, on various occasions, and in different postures of things, may prosecute their own designs by different measures, as in human prudence shall seem convenient. But what relation is there more extensive and universal than that of subject and law? This is confined to no particular age or climate, but universally obtains, at all times, and in all places, wherever men live in a state exalted above that of brutes. It is, therefore, evident that the rule forbidding resistance to the law or supreme power is not, upon pretence of any defect in point of universality, to be excluded from the number of the laws of nature.

19. Thirdly, there is another consideration which confirms the necessity of admitting this rule for a moral or natural law: namely, because the case it regards is of too nice and difficult a nature to be left to the judgment and determination of each private person. Some cases there are so plain and obvious to judge of that they may safely be trusted to the prudence of every reasonable man. But in all instances to determine, whether a civil law is fitted to promote the public interest; or whether submission or resistance will prove most advantageous in the consequence; or when it is that the general good of a nation may require an alteration of government, either in its form, or in the hands which administer it;—these are points too arduous and intricate, and which require too great a degree of parts,

leisure, and liberal education, as well as disinterestedness and thorough knowledge in the particular state of a kingdom, for every subject to take upon him the determination of them. From which it follows that, upon this account also, non-resistance, which, in the main, nobody can deny to be a most profitable and wholesome duty, ought not to be limited by the judgment of private persons to particular occasions, but esteemed a most sacred law of nature.

20. The foregoing arguments do, I think, make it manifest, that the precept against rebellion is on a level with other moral rules. Which will yet further appear from this fourth and last consideration. It cannot be denied that right reason doth require some common stated rule or measure, whereby subjects ought to shape their submission to the supreme power; since any clashing or disagreement in this point must unavoidably tend to weaken and dissolve the society. And it is unavoidable that there should be great clashing, where it is left to the breast of each individual to suit his fancy with a different measure of obedience. But this common stated measure must be either the general precept forbidding resistance, or else the public good of the whole nation; which last, though it is allowed to be in itself something certain and determinate, yet, forasmuch as men can regulate their conduct only by what appears to them, whether in truth it be what it appears or no; and, since the prospects men form to themselves of a country's public good are commonly as various as its landscapes, which meet the eye in several situations: it clearly follows, that to make the public good the rule of obedience is, in effect, not to establish any determinate, agreed, common measure of loyalty, but to leave every subject to the guidance of his own particular mutable fancy.

21. From all which arguments and considerations it is a most evident conclusion, that the law prohibiting rebellion is in strict truth a law of nature, universal reason, and morality. But to this it will perhaps be objected by some that, whatever may be concluded with regard to resistance from the tedious deductions of reason, yet there is I know not what turpitude and deformity in some actions, which at first blush shews them to be vicious; but they, not finding themselves struck with such a sensible and immediate horror at the thought of rebellion, cannot think it on

a level with other crimes against nature. To which I answer:—that it is true, there are certain natural antipathies implanted in the soul, which are ever the most lasting and insurmountable; but, as custom is a second nature, whatever aversions are from our early childhood continually infused into the mind give it so deep a stain as is scarce to be distinguished from natural complexion. And, as it doth hence follow, that to make all the inward horrors of soul pass for infallible marks of sin were the way to establish error and superstition in the world; so, on the other hand, to suppose all actions lawful which are unattended with those starts of nature would prove of the last dangerous consequence to virtue and morality. For, these pertaining to us as men, we must not be directed in respect of them by any emotions in our blood and spirits, but by the dictates of sober and impartial reason. And, if there be any who find they have a less abhorrence of rebellion than of other villanies, all that can be inferred from it is, that this part of their duty was not so much reflected on, or so early and frequently inculcated into their hearts, as it ought to have been. Since without question there are other men who have as thorough an aversion for that as for any other crime[15].

22. Again, it will probably be objected that submission to government differs from moral duties in that it is founded in a contract[16], which, upon the violation of its conditions, doth of course become void, and in such case rebellion is lawful: it hath not therefore the nature of a sin or crime, which is in itself absolutely unlawful, and must be committed on no pretext whatsoever.—Now, passing over all inquiry and dispute concerning the first obscure rise of government, I observe its being founded on a contract may be understood in a twofold sense:—either, first, that several independent persons, finding the insufferable inconvenience of a state of anarchy, where every one was governed by his own will, consented and agreed together to pay an absolute submission to the decrees of some certain legislative; which,

[15] ['Il disoit ordinairement qu'il avoit un aussi grand éloignement pour ce péché là que pour assassiner le monde, ou pour voler sur les grands chemins, et qu'enfin il n'y avoit rien qui fut plus contraire à son naturel.' He (Mr. Pascal) used to say he had as great an abhorrence of rebellion as of murder, or robbing on the high-way, and that there was nothing more shocking to his nature.—*Vide M. Pascal*, p. 44.]—AUTHOR.

[16] Cf. Locke's *Treatise on Government*, Bk. II. ch. 8.

though sometimes they may bear hard on the subject, yet must surely prove easier to be governed by than the violent humours and unsteady opposite wills of a multitude of savages. And, in case we admit such a compact to have been the original foundation of civil government, it must even on that supposition be held sacred and inviolable.

23. Or, secondly, it is meant that subjects have contracted with their respective sovereigns or legislators to pay, not an absolute, but conditional and limited, submission to their laws, that is, upon condition, and so far forth, as the observation of them shall contribute to the public good: reserving still to themselves a right of superintending the laws, and judging whether they are fitted to promote the public good or no; and (in case they or any of them think it needful) of resisting the higher powers, and changing the whole frame of government by force: which is a right that all mankind, whether single persons or societies, have over those that are deputed by them. But, in this sense, a contract cannot be admitted for the ground and measure of civil obedience, except one of these two things be clearly shewn:— either, first, that such a contract is an express known part of the fundamental constitution of a nation, equally allowed and unquestioned by all as the common law of the land; or, secondly, if it be not express, that it is at least necessarily implied in the very nature or notion of civil polity, which supposes it is a thing manifestly absurd, that a number of men should be obliged to live under an unlimited subjection to civil law, rather than continue wild and independent of each other. But to me it seems most evident that neither of those points will ever be proved.

24. And till they are proved beyond all contradiction, the doctrine built upon them ought to be rejected with detestation. Since, to represent the higher powers as deputies of the people manifestly tends to diminish that awe and reverence which all good men should have for the laws and government of their country. And to speak of a condition, limited loyalty, and I know not what vague and undetermined contracts, is a most effectual means to loosen the bands of civil society; than which nothing can be of more mischievous consequence to mankind. But, after all, if there be any man who either cannot or will

not see the absurdity and perniciousness of those notions, he would, I doubt not, be convinced with a witness, in case they should once become current, and every private man take it in his head to believe them true, and put them in practice.

25. But there still remains an objection which hath the appearance of some strength against what has been said. Namely, that, whereas civil polity is a thing entirely of human institution, it seems contrary to reason to make submission to it part of the law of nature, and not rather of the civil law. For, how can it be imagined that nature should dictate or prescribe a natural law about a thing which depends on the arbitrary humour of men, not only as to its kind or form, which is very various and mutable, but even as to its existence; there being no where to be found a civil government set up by nature.—In answer to this, I observe, first, that most moral precepts do presuppose some voluntary actions, or pacts of men, and are nevertheless esteemed laws of nature. Property is assigned, the signification of words ascertained, and matrimony contracted—by the agreement and consent of mankind; and, for all that, it is not doubted whether theft, falsehood, and adultery be prohibited by the law of nature. Loyalty, therefore, though it should suppose and be the result of human institutions, may, for all that, be of natural obligation.—I say, secondly, that, notwithstanding particular societies are formed by men, and are not in all places alike, as things esteemed natural are wont to be, yet there is implanted in mankind a natural tendency or disposition to a social life. I call it *natural*, because it is universal, and because it necessarily results from the differences which distinguish man from beast; the peculiar wants, appetites, faculties, and capacities of man being exactly calculated and framed for such a state, insomuch that without it it is impossible he should live in a condition in any degree suitable to his nature. And, since the bond and cement of society is a submission to its laws, it plainly follows that this duty hath an equal right with any other to be thought a law of nature. And surely that precept which enjoins obedience to civil laws cannot itself, with any propriety, be accounted a civil law; it must therefore either have no obligation at all on the conscience, or, if it hath, it must be derived from the universal voice of nature and reason.

26. And thus the first point proposed seems clearly made out:—namely, that Loyalty is a virtue or moral duty; and Disloyalty or Rebellion, in the most strict and proper sense, a vice or crime against the law of nature. We are now come to the second point, which was to shew[17] that the prohibitions of vice, or negative precepts of morality, are to be taken in a most absolute, necessary, and immutable sense; insomuch that the attainment of the greatest good, or deliverance from the greatest evil, that can befal any man or number of men in this life may not justify the least violation of them.—But, in the first place, I shall explain the reason of distinguishing between positive and negative precepts, the latter only being included in this general proposition. Now, the ground of that distinction may be resolved into this: namely, that very often, either through the difficulty or number of moral actions, or their inconsistence with each other, it is not possible for one man to perform several of them at the same time; whereas it is plainly consistent and possible that any man should, at the same time, abstain from all manner of positive actions whatsoever. Hence it comes to pass that prohibitions or negative precepts must by every one, in all times and places, be all actually observed: whereas those which enjoin the doing of an action allow room for human prudence and discretion in the execution of them: it is for the most part depending on various accidental circumstances; all which ought to be considered, and care taken that duties of less moment do not interfere with, and hinder the fulfilling of those which are more important. And, for this reason, if not the positive laws themselves, at least the exercise of them, admits of suspension, limitation, and diversity of degrees. As to the indispensableness of the negative precepts of the law of nature, I shall in its proof offer two arguments; the first from the nature of the thing, and the second from the imitation of God in His government of the world.

27. First, then, from the nature of the thing it hath been already shewn that the great end of morality can never be carried on, by leaving each particular person to promote the public good in such a manner as he shall think most convenient, without

[17] Sect. 26—32.

prescribing certain determinate universal rules, to be the common measure of moral actions. And, if we allow the necessity of these, and at the same time think it lawful to transgress them whenever the public good shall seem to require it, what is this but in words indeed to enjoin the observation of moral rules, but in effect to leave every one to be guided by his own judgment? than which nothing can be imagined more pernicious and destructive to mankind, as hath been already proved. Secondly, this same point ma be collected from the example set us by the Author of nature, who, as we have above observed[18], acts according to certain fixed laws, which He will not transgress upon the account of accidental evils arising from them. Suppose a prince on whose life the welfare of a kingdom depends to fall down a precipice, we have no reason to think that the universal law of gravitation would be suspended in that case. The like may be said of all other laws of nature, which we do not find to admit of exceptions on particular accounts.

28. And as, without such a steadiness[19] in nature, we should soon, instead of this beautiful frame, see nothing but a disorderly and confused chaos; so, if once it become current that the moral actions of men are not to be guided by certain definite inviolable rules, there will be no longer found that beauty, order, and agreement in the system of rational beings, or moral world, which will then be all covered over with darkness and violence. It is true, he who stands close to a palace can hardly make a right judgment of the architecture and symmetry of its several parts, the nearer ever appearing disproportionably great. And, if we have a mind to take a fair prospect of the order and general well-being which the inflexible laws of nature and morality derive on the world, we must, if I may so say, go out of it, and imagine ourselves to be distant spectators of all that is transacted and contained in it; otherwise we are sure to be deceived by the too near view of the little present interests of ourselves, our friends, or our country[20].

The right understanding of what hath been said will, I think, afford a clear solution to the following difficulties:—

29. First, it may perhaps seem to some that, in consequence

[18] Sect. 14.

[19] Cf. *Principles of Human Knowledge*, sect. 30—32.

[20] Cf. *Guardian*, No. 70, 83.

of the foregoing doctrine, men will be left to their own private judgments as much as ever. For, first, the very being of the laws of nature; secondly, the criterion whereby to know them; and, thirdly, the agreement of any particular precept with that criterion are all to be discovered by reason and argumentation, in which every man doth necessarily judge for himself: hence, upon that supposition, there is place for as great confusion, unsteadiness, and contrariety of opinions and actions as upon any other. I answer, that however men may differ as to what were most proper and beneficial to the public to be done or omitted on particular occasions, when they have for the most part narrow and interested views; yet, in general conclusions, drawn from an equal and enlarged view of things, it is not possible there should be so great, if any, disagreement at all amongst candid rational inquirers after truth.

30. Secondly, the most plausible pretence of all against the doctrine we have premised concerning a rigid indispensable observation of moral rules is that which is founded on the consideration of the public weal[21]. For, since the common good of mankind is confessedly the end which God requires should be promoted by the free actions of men, it may seem to follow that all good men ought ever to have this in view, as the great mark to which all their endeavours should be directed; if, therefore, in any particular case, a strict keeping to the moral rule shall prove manifestly inconsistent with the public good, it may be thought agreeable to the will of God that in that case the rule does restrain an honest disinterested person, from acting for that end to which the rule itself was ordained. For, it is an axiom that 'the end is more excellent than the means,' which, deriving their goodness from the end, may not come in competition with it.

31. In answer to this, let it be observed, that nothing is a law merely because it conduceth to the public good, but because it is decreed by the will of God, which alone can give the sanction of a law of nature to any precept; neither is any thing, how expedient or plausible soever, to be esteemed lawful on any other account than its being coincident with, or not repugnant to,

[21] See Locke's *Treatise on Government*, Bk. II. ch. 19.

the laws promulgated by the voice of nature and reason. It must indeed be allowed that the rational deduction of those laws is founded in the intrinsic tendency they have to promote the well-being of mankind, on condition they are universally and constantly observed. But, though it afterwards comes to pass that they accidentally fail of that end, or even promote the contrary, they are nevertheless binding, as hath been already proved. In short, that whole difficulty may be resolved by the following distinction.—In framing the general laws of nature, it is granted we must be entirely guided by the public good of mankind, but not in the ordinary moral actions of our lives. Such a rule, if universally observed, hath, from the nature of things, a necessary fitness to promote the general well-being of mankind: therefore it is a law of nature. This is good reasoning. But if we should say, such an action doth in this instance produce much good, and no harm to mankind; therefore it is lawful: this were wrong. The rule is framed with respect to the good of mankind; but our practice must be always shaped immediately by the rule. They who think the public good of a nation to be the sole measure of the obedience due to the civil power seem not to have considered this distinction.

32. If it be said that some negative precepts, *e. g.* 'Thou shalt not kill,' do admit of limitation, since otherwise it were unlawful for the magistrate, for a soldier in a battle, or a man in his own defence, to kill another;—I answer, when a duty is expressed in too general terms, as in this instance, in order to a distinct declaration of it, either those terms may be changed for others of a more limited sense, as *kill* for *murder*, or else, from the general proposition remaining in its full latitude, exceptions may be made of those precise cases which, not agreeing with the notion of murder, are not prohibited by the law of nature. In the former case there is a limitation; but it is only of the signification of a single term too general and improper, by substituting another more proper and particular in its place. In the latter case there are exceptions; but then they are not from the law of nature, but from a more general proposition which, besides that law, includes somewhat more, which must be taken away in order to leave the law by itself clear and determinate. From neither of which concessions will it follow

that any negative law of nature is limited to those cases only where its particular application promotes the public good, or admits all other cases to be excepted from it wherein its being actually observed produceth harm to the public. But of this I shall have occasion to say more in the sequel.

I have now done with the first head, which was to shew that there is an absolute, unlimited, passive obedience due to the supreme power, wherever placed in any nation; and come to inquire into the grounds and reasons of the contrary opinion: which was the second thing proposed.

33. One great principle which the pleaders for resistance make the ground-work of their doctrine is, that the law of self-preservation is prior to all other engagements, being the very first and fundamental law of nature[22]. Hence, say they, subjects are obliged by nature, and it is their duty, to resist the cruel attempts of tyrants, however authorised by unjust and bloody laws, which are nothing else but the decrees of men, and consequently must give way to those of God or nature. But, perhaps if we narrowly examine this notion, it will not be found so just and clear as some men may imagine, or, indeed, as at first sight it seems to be. For, we ought to distinguish between a twofold signification of the terms *law of nature*; which words do either denote a rule or precept for the direction of the voluntary actions of reasonable agents, and in that sense they imply a duty; or else they are used to signify any general rule which we observe to obtain in the works of nature, independent of the wills of men; in which sense no duty is implied. And, in this last acceptation, I grant it is a general law of nature, that in every animal there be implanted a desire of self-preservation, which, though it is the earliest, the deepest, and most lasting of all, whether natural or acquired appetites, yet cannot with any propriety be termed a moral duty. But if, in the former sense of the words, they mean that self-preservation is the first and most fundamental law of nature, which therefore must take place of all

[22] So Locke in his *Treatise on Government*, which should be compared with this and the following sections.

other natural or moral duties, I think that assertion to be manifestly false; for this plain reason, because it would thence follow, a man may lawfully commit any sin whatsoever to preserve his life, than which nothing can be more absurd.

34. It cannot indeed be denied that the law of nature restrains us from doing those things which may injure the life of any man, and consequently our own. But, notwithstanding all that is said of the obligativeness and priority of the law of self-preservation, yet, for aught I can see, there is no particular law which obliges any man to prefer his own temporal good, not even life itself, to that of another man, much less to the observation of any one moral duty. This is what we are too ready to perform of our own accord; and there is more need of a law to curb and restrain, than there is of one to excite and inflame our self-love.

35. But, secondly, though we should grant the duty of self-preservation to be the first and most necessary of all the positive or affirmative laws of nature; yet, forasmuch as it is a maxim allowed by all moralists, that 'evil is never to be committed, to the end good may come of it,' it will thence plainly follow that no negative precept ought to be transgressed for the sake of observing a positive one; and therefore, since we have shewn, 'Thou shalt not resist the supreme power,' to be a negative law of nature, it is a necessary consequence that it may not be transgressed under pretence of fulfilling the positive duty of self-preservation.

36. A second erroneous ground of our adversaries, whereon they lay a main stress, is that they hold the public good of a particular nation to be the measure of the obedience due from the subject to the civil power, which therefore may be resisted whensoever the public good shall verily seem to require it. But this point hath been already considered; and in truth it can give small difficulty to whoever understands loyalty to be on the same foot with other moral duties enjoined in negative precepts, all which, though equally calculated to promote the general well-being, may not nevertheless be limited or suspended under pretext of giving way to the end, as is plain from what hath been premised on that subject.

37. A third reason which they insist on is to this effect:—

All civil authority or right is derived originally from the people; but nobody can transfer that to another which he hath not himself; therefore, since no man hath an absolute unlimited right over his own life, the subject cannot transfer such a right to the prince (or supreme power), who consequently hath no such unlimited right to dispose of the lives of his subjects. In case, therefore, a subject resist his prince, who, acting according to law, maketh an unjust, though legal, attempt on his life, he does him no wrong; since wrong it is not, to prevent another from seizing what he hath no right to: whence it should seem to follow that, agreeably to reason, the prince, or supreme power, wheresoever placed, may be resisted. Having thus endeavoured to state their argument in its clearest light, I make this answer:— First, it is granted, no civil power hath an unlimited right to dispose of the life of any man. Secondly, in case one man resist another invading that which he hath no right to, it is granted he doth him no wrong. But, in the third place, I deny that it doth thence follow, the supreme power may consonantly to reason be resisted; because that, although such resistance wronged not the prince or supreme power wheresoever placed, yet it were injurious to the author of nature, and a violation of his law, which reason obligeth us to transgress upon no account whatsoever, as hath been demonstrated.

38. A fourth mistake or prejudice which influenceth the impugners of non-resistance arises from the natural dread of slavery, chains, and fetters, which inspires them with an aversion for any thing, which even metaphorically comes under those denominations. Hence they cry out against us that we would deprive them of their natural freedom, that we are making chains for mankind, that we are for enslaving them, and the like. But, how harsh soever the sentence may appear, yet it is most true, that our appetites, even the most natural, as of ease, plenty, or life itself, must be chained and fettered by the laws of nature and reason. This slavery, if they will call it so, or subjection of our passions to the immutable decrees of reason, though it may be galling to the sensual part or the beast, yet sure I am it addeth much to the dignity of that which is peculiarly human in our composition. This leads me to the fifth fundamental error.

39. Namely, the mistaking the object of passive obedience.

We should consider that when a subject endures the insolence and oppression of one or more magistrates, armed with the supreme civil power, the object of his submission is, in strict truth, nothing else but right reason, which is the voice of the Author of nature. Think not we are so senseless as to imagine tyrants cast in a better mould than other men: no, they are the worst and vilest of men, and for their own sakes have not the least right to our obedience. But the laws of God and nature must be obeyed, and our obedience to them is never more acceptable and sincere than when it exposeth us to temporal calamities.

40. A sixth false ground of persuasion to those we argue against is their not distinguishing between the natures of positive and negative duties. For, say they, since our active obedience to the supreme civil power is acknowledged to be limited, why may not our duty of non-resistance be thought so too? The answer is plain; because positive and negative moral precepts are not of the same nature—the former admitting such limitations and exceptions as the latter are on no account liable to, as hath been already proved. It is very possible that a man, in obeying the commands of his lawful governors, might transgress some law of God contrary to them; which it is not possible for him to do merely by a patient suffering and non-resistance for conscience sake. And this furnishes such a satisfactory and obvious solution of the fore-mentioned difficulty that I am not a little surprised to see it insisted on, by men, otherwise, of good sense and reason. And so much for the grounds and reasons of the adversaries of non-resistance.

I now proceed to the third and last thing proposed, namely, the consideration of the objections drawn from the pretended consequences of non-resistance[23].

41. First, then, it will be objected that, in consequence of that notion, we must believe that God hath, in several instances, laid the innocent part of mankind under an unavoidable necessity of enduring the greatest sufferings and hardships without any remedy;

[23] Some of those referred to may be found in Locke.

which is plainly inconsistent with the Divine wisdom and goodness: and therefore the principle from whence that consequence flows, ought not to be admitted as a law of God or nature. In answer to which I observe, we must carefully distinguish between the necessary and accidental consequences of a moral law. The former kind are those which the law is in its own nature calculated to produce, and which have an inseparable connexion with the observation of it; and indeed, if these are bad, we may justly conclude the law to be so too, and consequently not from God. But the accidental consequences of a law have no intrinsic natural connexion with, nor do they strictly speaking flow from its observation, but are the genuine result of something foreign and circumstantial, which happens to be joined with it. And these accidental consequences of a very good law may nevertheless be very bad; which badness of theirs is to be charged on their own proper and necessary cause, and not on the law, which hath no essential tendency to produce them. Now, though it must be granted that a lawgiver infinitely wise and good will constitute such laws for the regulation of human actions as have in their own nature a necessary inherent aptness to promote the common good of all mankind, and that in the greatest degree that the present circumstances and capacities of human nature will admit, yet we deny that the wisdom and goodness of the lawgiver are concerned, or may be called in question, on account of the particular evils which arise, necessarily and properly, from the transgression of some one or more good laws, and but accidentally from the observation of others. But it is plain that the several calamities and devastations which oppressive governments bring on the world are not the genuine necessary effects of the law that enjoineth a passive subjection to the supreme power, neither are they included in the primary intention thereof, but spring from avarice, ambition, cruelty, revenge, and the like inordinate affections and vices raging in the breasts of governors. They may not therefore argue a defect of wisdom or goodness in God's law, but of righteousness in men.

42. Such is the present state of things, so irregular are the wills, and so unrestrained the passions, of men, that we every day see manifest breaches and violations of the laws of nature, which, being always committed in favour of the wicked, must surely be

sometimes attended with heavy disadvantages and miseries on the part of those who by a firm adhesion to His laws endeavour to approve themselves in the eyes of their Creator. There are in short no rules of morality, not excepting the best, but what may subject good men to great sufferings and hardships; which necessarily follows from the wickedness of those they have to deal with, and but accidentally from those good rules. And as, on the one hand, it were inconsistent with the wisdom of God, by suffering a retaliation of fraud, perjury, or the like, on the head of offenders, to punish one transgression by another: so, on the other hand, it were inconsistent with His justice to leave the good and innocent a hopeless sacrifice to the wicked. God therefore hath appointed a day of retribution in another life, and in this we have His grace and a good conscience for our support. We should not therefore repine at the Divine laws, or shew a frowardness or impatience of those transient sufferings they accidentally expose us to, which, however grating to flesh and blood, will yet seem of small moment, if we compare the littleness and fleetingness of this present world with the glory and eternity of the next.

43. From what hath been said, I think it is plain that the premised doctrine of non-resistance were safe, though the evils incurred thereby should be allowed never so great. But perhaps, upon a strict examination, they will be found much less than by many they are thought to be. The mischievous effects which are charged on that doctrine may be reduced to these two points:—First, that it is an encouragement for all governors to become tyrants, by the prospect it gives them of impunity or non-resistance. Secondly, that it renders the oppression and cruelty of those who are tyrants more insupportable and violent, by cutting off all opposition, and consequently all means of redress. I shall consider each of these distinctly.—As to the first point, either you will suppose the governors to be good or ill men. If they are good, there is no fear of their becoming tyrants. And if they are ill men, that is, such as postpone the observation of God's laws to the satisfying of their own lusts, then it can be no security to them that others will rigidly observe those moral precepts which they find themselves so prone to transgress.

44. It is indeed a breach of the law of nature for a subject, though under the greatest and most unjust sufferings, to lift up

his hand against the supreme power. But it is a more heinous and inexcusable violation of it for the persons invested with the supreme power to use that power to the ruin and destruction of the people committed to their charge. What encouragement therefore can any man have to think that others will not be pushed on by the strong implanted appetite of self-preservation, to commit a crime, when he himself commits a more brutish and unnatural crime, perhaps without any provocation at all? Or is it to be imagined that they who daily break God's laws, for the sake of some little profit or transient pleasure, will not be tempted, by the love of property, liberty, or life itself, to transgress that single precept which forbids resistance to the supreme power?

45. But it will be demanded—To what purpose then is this duty of non-resistance preached, and proved, and recommended to our practice, if, in all likelihood, when things come to an extremity, men will never observe it? I answer, to the very same purpose that any other duty is preached. For, what duty is there which many, too many, upon some consideration or other, may not be prevailed on to transgress? Moralists and divines do not preach the duties of nature and religion with a view of gaining mankind to a perfect observation of them; that they know is not to be done. But, however, our pains are answered, if we can make men less sinners than otherwise they would be; if, by opposing the force of duty to that of present interest and passion, we can get the better of some temptations, and balance others, while the greatest still remain invincible.

46. But, granting those who are invested with the supreme power to have all imaginable security that no cruel and barbarous treatment whatever could provoke their subjects to rebellion, yet I believe it may be justly questioned, whether such security would tempt them to more or greater acts of cruelty than jealousy, distrust, suspicion, and revenge may do in a state less secure. —And so far in consideration of the first point, namely, that the doctrine of non-resistance is an encouragement for governors to become tyrants.

47. The second mischievous effect it was charged with is, that it renders the oppression and cruelty of those who are tyrants more insupportable and violent, by cutting off all opposition, and consequently all means of redress. But, if things are rightly con-

sidered, it will appear that redressing the evils of government by force is at best a very hazardous attempt, and what often puts the public in a worse state than it was before. For, either you suppose the power of the rebels to be but small, and easily crushed, and then this is apt to inspire the governors with confidence and cruelty. Or, in case you suppose it more considerable, so as to be a match for the supreme power supported by the public treasure, forts, and armies, and that the whole nation is engaged in a civil war;—the certain effects of this are, rapine, bloodshed, misery, and confusion to all orders and parties of men, greater and more insupportable by far than are known under any the most absolute and severe tyranny upon earth. And it may be that, after much mutual slaughter, the rebellious party may prevail. And if they do prevail to destroy the government in being, it may be they will substitute a better in its place, or change it into better hands. And may not this come to pass without the expense, and toil, and blood of war? Is not the heart of a prince in the hand of God? May He not therefore give him a right sense of his duty, or may He not call him out of the world by sickness, accident, or the hand of some desperate ruffian, and send a better in his stead? When I speak as of a monarchy, I would be understood to mean all sorts of government, wheresoever the supreme power is lodged. Upon the whole, I think we may close with the heathen philosopher, who thought it the part of a wise man never to attempt the change of government by force, when it could not be mended without the slaughter and banishment of his countrymen: but to sit still, and pray for better times[24]. For, this way may do, and the other may not do; there is uncertainty in both courses. The difference is that in the way of rebellion we are sure to increase the public calamities, for a time at least, though we are not sure of lessening them for the future.

48. But, though it should be acknowledged that, in the main, submission and patience ought to be recommended, yet, men will be still apt to demand, whether extraordinary cases may not

[24] [Plato in Epist. vii.]—Author. The passage referred to is the following:—*Λέγειν μὲν, εἰ μὴ καλῶς αὐτῷ φαίνοιτο πολιτεύεσθαι, εἰ μέλλοι μήτε ματαίως ἐρεῖν, μήτε ἀποθανεῖσθαι λέγων, βίαν δὲ πατρίδι πολιτείας μεταβολῆς μὴ προσφέρειν, ὅταν ἄνευ φυγῆς καὶ σφαγῆς ἀνδρῶν μὴ δυνατὸν ᾖ γίγνεσθαι τὴν ἀρίστην, ἡσυχίαν δὲ ἄγοντα εὔχεσθαι τὰ ἀγαθὰ αὐτῷ τε καὶ τῇ πόλει.*

require extraordinary measures; and therefore, in case the oppression be insupportable, and the prospect of deliverance sure, whether rebellion may not be allowed of? I answer, by no means. Perjury, or breach of faith, may, in some possible cases, bring great advantage to a nation, by freeing it from conditions inconsistent with its liberty and public welfare. So likewise may adultery, by procuring a domestic heir, prevent a kingdom's falling into the hands of a foreign power, which would in all probability prove its ruin. Yet, will any man say, the extraordinary nature of those cases can take away the guilt of perjury and adultery[25]? This is what I will not suppose. But it hath been shewn, that rebellion is as truly a crime against nature and reason as either of the foregoing; it may not therefore be justified upon any account whatever, any more than they.

49. What! must we then submit our necks to the sword? and is there no help, no refuge, against extreme tyranny established by law? In answer to this I say, in the first place, it is not to be feared that men in their wits should seek the destruction of their people, by such cruel and unnatural decrees as some are forward to suppose. I say, secondly, that, in case they should, yet most certainly the subordinate magistrates may not, nay, they ought not, in obedience to those decrees, to act any thing contrary to the express laws of God. And, perhaps, all things considered, it will be thought that representing this limitation of their active obedience, by the laws of God or nature, as a duty to the ministers of the supreme power, may prove in those extravagant supposed cases no less effectual for the peace

[25] [When I wrote this, I could not think any man would avow the justifying those crimes on any pretext: but I since find that an author (supposed the same who published the book entitled, *The Rights of the Christian Church*), in a *Discourse concerning Obedience to the Supreme Powers*, printed with three other discourses at London, in the year 1709, chap. iv. p. 28. speaking of Divine laws, is not ashamed to assert, 'There is no law which wholly relates to man but ceases to oblige, if, upon the infinite variety of circumstances attending human affairs, it happens to be contrary to the good of man.' So that, according to this writer, parricide, incest, or breach of faith become innocent things, if, in the infinite variety of circumstances, they should happen to promote (or be thought by any private person to promote) the public good. After what has been already said, I hope I need not be at any pains to convince the reader of the absurdity and perniciousness of this notion. I shall only observe, that it appears the author was led into it by a more than ordinary aversion to passive obedience, which put him upon measuring or limiting that duty, and, with equal reason, all others, by the public good, to the entire unhinging of all order and morality among men. And it must be owned the transition was very natural.]—Author. This note was added in the third edition. The author referred to is Tyndall. Cf. *Theory of Vision Vindicated*, sect. 2, 5, notes by Editor.

and safety of a nation than preaching up the power of resistance to the people.

50. Further, it will probably be objected as an absurdity in the doctrine of passive obedience, that it enjoineth subjects a blind implicit submission to the decrees of other men; which is unbecoming the dignity and freedom of reasonable agents; who indeed ought to pay obedience to their superiors, but it should be a rational obedience, such as arises from a knowledge of the equity of their laws, and the tendency they have to promote the public good. To which I answer, that it is not likely a government should suffer much for want of having its laws inspected and amended by those who are not legally entitled to a share in the management of affairs of that nature. And it must be confessed the bulk of mankind are by their circumstances and occupations so far unqualified to judge of such matters, that they must necessarily pay an implicit deference to some or other; and to whom so properly as to those invested with the supreme power?

51. There is another objection against absolute submission, which I should not have mentioned but that I find it insisted on by men of so great note as Grotius and Puffendorf[26], who think our non-resistance should be measured by the intention of those who first framed the society. Now, say they, if we suppose the question put to them, whether they meant to lay every subject under the necessity of choosing death, rather than in any case to resist the cruelty of his superiors, it cannot be imagined they would answer in the affirmative. For, this were to put themselves in a worse condition than that which they endeavoured to avoid by entering into society. For, although they were before obnoxious to the injuries of many, they had nevertheless the power of resisting them. But now they are bound, without any opposition at all, to endure the greatest injuries from those whom they have armed with their own strength. Which is by so much worse than the former state, as the undergoing an execution is worse than the hazard of a battle. But (passing by all other exceptions which this method of arguing may be liable to), it is evident that a man had better be exposed to the

[26] [Grotius *De Jure Belli et Pacis*, lib. I. chap. iv. sect. 7; et Puffendorf *De Jure Naturæ et Gentium*, lib. VII. cap. vii. sect. 7.] —Author.

absolute irresistible decrees, even of one single person, whose own and posterity's true interest it is to preserve him in peace and plenty, and protect him from the injuries of all mankind beside, than remain an open prey to the rage and avarice of every wicked man upon earth, who either exceeds him in strength, or takes him at an advantage. The truth of this is confirmed, as well by the constant experience of the far greater part of the world, as by what we have already observed concerning anarchy, and the inconsistence of such a state with that manner of life which human nature requires. Hence it is plain the objection last mentioned is built on a false supposition; viz. That men, by quitting the natural state of anarchy for that of absolute non-resisting obedience to government, would put themselves in a worse condition than they were in before.

52. The last objection I shall take notice of is, that, in pursuance of the premised doctrine, where no exceptions, no limitations, are to be allowed of, it should seem to follow men were bound to submit without making any opposition to usurpers, or even madmen, possessed of the supreme authority. Which is a notion so absurd, and repugnant to common sense, that the foundation on which it is built may justly be called in question. Now, in order to clear this point, I observe the limitation of moral duties may be understood in a twofold sense—either, first, as a distinction applied to the terms of a proposition, whereby that which was expressed before too generally is limited to a particular acceptation; and this, in truth, is not so properly limiting the duty as defining it. Or, secondly, it may be understood as a suspending the observation of a duty for avoiding some extraordinary inconvenience, and thereby confining it to certain occasions. And in this last sense only, we have shewn negative duties not to admit of limitation. Having premised this remark, I make the following answer to the objection:—namely, that by virtue of the duty of non-resistance we are not obliged to submit the disposal of our lives and fortunes to the discretion either of madmen, or of all those who by craft or violence invade the supreme power; because the object of the submission enjoined subjects by the law of nature is, from the reason of the thing, manifestly limited so as to exclude both the one and the other. Which I shall not go about to prove, because

I believe nobody has denied it. Nor doth the annexing such limits to the object of our obedience at all limit the duty itself, in the sense we except against.

53. [[27] In morality the eternal rules of action have the same immutable universal truth with propositions in geometry. Neither of them depends on circumstances or accidents, being at all times and in all places, without limitation or exception, true. 'Thou shalt not resist the supreme civil power' is no less constant and unalterable a rule, for modelling the behaviour of a subject toward the government, than 'multiply the height by half the base' is for measuring a triangle. And, as it would not be thought to detract from the universality of this mathematical rule that it did not exactly measure a field which was not an exact triangle, so ought it not to be thought an argument against the universality of the rule prescribing passive obedience that it does not reach a man's practice in all cases where a government is unhinged, or the supreme power disputed. There must be a triangle, and you must use your senses to know this, before there is room for applying your mathematical rule. And there must be a civil government, and you must know in whose hands it is lodged, before the moral precept takes place. But, where the supreme power is ascertained, we should no more doubt of our submission to it, than we would doubt of the way to measure a figure we know to be a triangle.]

54. In the various changes and fluctuations of government, it is impossible to prevent that controversies should sometimes arise concerning the seat of the supreme power. And in such cases subjects cannot be denied the liberty of judging for themselves, or of taking part with some, and opposing others, according to the best of their judgments; all which is consistent with an exact observation of their duty, so long as, when the constitution is clear in the point, and the object of their submission undoubted, no pretext of interest, friends, or the public good, can make them depart from it. In short, it is acknowledged that the precept enjoining non-resistance is limited to particular objects, but not to particular occasions. And in this it is like

[27] This section was added in the third edition. It is remarkable for the strong expression of the eternity and immutability of moral rules with which it opens. Cf. sect. 12.

all other moral negative duties, which, considered as general propositions, do admit of limitations and restrictions, in order to a distinct definition of the duty; but what is once known to be a duty of that sort can never become otherwise by any good or ill effect, circumstance, or event whatsoever. And in truth if it were not so, if there were no general inflexible rules, but all negative as well as positive duties might be dispensed with, and warpt to serve particular interests and occasions, there were an end of all morality.

55. It is therefore evident that, as the observation of any other negative moral law is not to be limited to those instances only where it may produce good effects, so neither is the observation of non-resistance limited in such sort as that any man may lawfully transgress it, whensoever in his judgment the public good of his particular country shall require it. And it is with regard to this limitation by the effects that I speak of non-resistance as an absolute, unconditioned, unlimited duty. Which must inevitably be granted, unless one of these three things can be proved:—either, first, that non-resistance is no moral duty: or, secondly, that other negative moral duties are limited by the effects: or, lastly, that there is something peculiar in the nature of non-resistance, which necessarily subjects it to such a limitation as no other negative moral duty can admit. The contrary to each of which points, if I mistake not, hath been clearly made out.

56. I have now briefly gone through the objections drawn from the consequences of non-resistance, which was the last general head I proposed to treat of. In handling this and the other points, I have endeavoured to be as full and clear as the usual length of these discourses would permit, and throughout to consider the argument with the same indifference as I should any other part of general knowledge, being verily persuaded that men as Christians are obliged to the practice of no one moral duty which may not abide the severest test of Reason.

ESSAYS IN THE GUARDIAN.

1713.

ESSAYS IN THE GUARDIAN[1].

I.

REMARKS ON COLLINS' 'DISCOURSE OF FREE-THINKING[2].'

Quicquid est illud quod sentit, quod sapit, quod vult, quod viget, cœleste et divinum est, ob eamque rem, æternum sic necesse est.—CICERO.

Whatever that be which thinks, which understands, which wills, which acts, it is something celestial and divine, and, upon that account, must necessarily be eternal.

I AM diverted from the account I was giving the town of my particular concerns, by casting my eye upon a Treatise which I could not overlook without an inexcusable negligence, and want of concern for all the civil as well as religious interests of mankind. This piece has for its title, *A Discourse of Free-thinking, occasioned by the rise and growth of a Sect called Free-thinkers*[3]. The author very methodically enters upon his

[1] The fourteen Essays in the *Guardian* which are here reprinted are attributed to Berkeley upon external and internal evidence which, in the case of most of them, seems ample. *Guardian*, Nos. 3, 27, 35, 39, 49, 55, 62, 70, 77, and 126, are assigned to him by his son, Dr. George Berkeley, as well as by the annotators, who add to these Nos. 83, 88, 89. No. 69 is claimed for Berkeley in the *Gent. Mag.* These Essays are not contained in any of the former editions of his collected works. They were probably written during his stay in London in 1713, when the recommendations of his countrymen Swift and Steele, added to the reputation he had already gained as a scholar and a metaphysician, and the attraction of his manner, introduced him, on his first appearance in London, to the chief centres of English society, in that Augustan age of English literature. Their main design was to defend Christian Theism against the materialistic Free-thinkers of the day. The spiritual philosophy which runs through them was employed, in its more developed state, and in its less obvious conclusions, in a similar service, nearly twenty years afterwards, in *Alciphron*.

[2] *Guardian*, No. 3, Saturday, March 14, 1713. This paper is claimed for Berkeley by his son, but in Steele's *Apology* (pp. 44–45) an extract is given from it, and it is said in the margin that Steele was the author.

[3] By Anthony Collins—published early in 1713.

argument, and says,—'By *free-thinking* I mean the use of the understanding in endeavouring to find out the meaning of any proposition whatsoever, in considering the nature of the evidence for or against it, and in judging of it according to the seeming force or weakness of the evidence.' As soon as he has delivered this definition, from which one would expect he did not design to shew a particular inclination for or against any thing before he had considered it, he gives up all title to the character of a Free-thinker, with the most apparent prejudice against a body of men whom of all other a good man would be most careful not to violate, I mean men in holy orders. Persons who have devoted themselves to the service of God are venerable to all who fear Him; and it is a certain characteristic of a dissolute and ungoverned mind, to rail or speak disrespectfully of them in general. It is certain that in so great a crowd of men some will intrude who are of tempers very unbecoming their function; but because ambition and avarice are sometimes lodged in that bosom which ought to be the dwelling of sanctity and devotion, must this unreasonable author vilify the whole order? He has not taken the least care to disguise his being an enemy to the persons against whom he writes, nor any where granted that the institution of religious men to serve at the altar, and instruct such who are not as wise as himself, is at all necessary or desirable; but proceeds, without the least apology, to undermine their credit, and frustrate their labours. Whatever clergymen, in disputes against each other, have unguardedly uttered is here recorded in such a manner as to affect religion itself, by wresting concessions to its disadvantage from its own teachers.

If this be true, as sure any man that reads the *Discourse* must allow it is, and if religion is the strongest tie of human society, in what manner are we to treat this our common enemy, who promotes the growth of such a sect as he calls Free-thinkers? He that should burn a house, and justify the action by asserting he is a free agent, would be more excusable than this author in uttering what he has from the right of a Free-thinker. But there are a set of dry, joyless, dull fellows, who want capacities and talents to make a figure amongst mankind upon benevolent and generous principles, that think to surmount their own natural meanness, by laying offences in the way of such as make it their endeavour to excel upon the received

maxims and honest arts of life. If it were possible to laugh at so melancholy an affair as what hazards salvation, it would be no unpleasant inquiry to ask what satisfactions they reap, what extraordinary gratification of sense, or what delicious libertinism this sect of Free-thinkers enjoy, after getting loose of the laws which confine the passions of other men? Would it not be a matter of mirth to find, after all, that the heads of this growing sect are sober wretches, who prate whole evenings over coffee, and have not themselves fire enough to be any further debauchees than merely in principle? These sages of iniquity are, it seems, themselves only speculatively wicked, and are contented that all the abandoned young men of the age are kept safe from reflection by dabbling in their rhapsodies, without tasting the pleasures for which their doctrines leave them unaccountable. Thus do heavy mortals, only to gratify a dry pride of heart, give up the interests of another world, without enlarging their gratifications in this; but it is certain there are a sort of men that can puzzle truth, but cannot enjoy the satisfaction of it. This same Free-thinker is a creature unacquainted with the emotions which possess great minds when they are turned for religion, and it is apparent that he is untouched with any such sensation as the rapture of devotion. Whatever one of these scorners may think, they certainly want parts to be devout; and a sense of piety towards heaven, as well as the sense of any thing else, is lively and warm in proportion to the faculties of the head and heart. This gentleman may be assured he has not a taste for what he pretends to decry, and the poor man is certainly more a blockhead than an atheist. I must repeat that he wants capacity to relish what true piety is; and he is as capable of writing an heroic poem as making a fervent prayer. When men are thus low and narrow in their apprehensions of things, and at the same time vain, they are naturally led to think every thing they do not understand not to be understood. Their contradiction to what is urged by others is a necessary consequence of their incapacity to receive it. The atheistical fellows who appeared the last age did not serve the devil for nought, but revelled in excesses suitable to their principles; while in these unhappy days mischief is done for mischief's sake. These Free-thinkers, who lead the lives of recluse students for no other purpose but to disturb the sentiments of other men,

put me in mind of the monstrous recreation of those late wild youths, who, without provocation, had a wantonness in stabbing and defacing those they met with. When such writers as this, who has no spirit but that of malice, pretend to inform the age, mohocks and cut-throats may well set up for wits and men of pleasure.

It will be perhaps expected, that I should produce some instances of the ill intention of this Free-thinker, to support the treatment I here give him. In his 52nd page he says:—

'2ndly. The priests throughout the world differ about scriptures, and the authority of scriptures. The Bramins have a book of scripture called the Shaster. The Persees have their Zundavastaw. The Bonzes of China have books written by the disciples of Fo-he, whom they call the "God and Saviour of the world, who was born to teach the way of salvation, and to give satisfaction for all men's sins." The Talapoins of Siam have a book of scripture written by Sommonocodom, who, the Siamese say, was "born of a virgin," and was "the God expected by the universe." The Dervises have their Alcoran.'

I believe there is no one will dispute the author's great impartiality in setting down the accounts of these different religions. And I think it is pretty evident he delivers the matter with an air which betrays that the history of 'one born of a virgin' has as much authority with him from St. Sommonocodom as from St. Matthew. Thus he treats revelation. Then, as to philosophy, he tells you, p. 136, Cicero produces this as an instance of a probable opinion,—'that they who study philosophy do not believe there are any Gods;' and then, from consideration of various notions, he affirms Tully concludes,—'that there can be nothing after death.'

As to what he misrepresents of Tully, the short sentence on the head of this paper is enough to oppose; but who can have patience to reflect upon the assemblage of impostures among which our author places the religion of his country? As for my part, I cannot see any possible interpretation to give this work, but a design to subvert and ridicule the authority of Scripture. The peace and tranquillity of the nation, and regards even above those, are so much concerned in this matter that it is difficult to express sufficient sorrow for the offender, or indignation against

him. But if ever man deserved to be denied the common benefits of air and water, it is the author of *A Discourse of Free-thinking*[4].

II.

NATURAL GROUNDS TO EXPECT A FUTURE STATE[5].

Multa putans, sortemque animo miseratus iniquam.
VIRG. *Æn.* 6. v. 332.
Struck with compassion of so sad a state.

IN compassion to those gloomy mortals who by their unbelief are rendered incapable of feeling those impressions of joy and hope which the celebration of the late glorious festival[6] naturally leaves on the mind of a Christian, I shall in this paper endeavour to evince that there are grounds to expect a Future State—without supposing in the reader any faith at all, not even the belief of a Deity. Let the most stedfast unbeliever open his eyes, and take a survey of the sensible world, and then say if there be not a connexion, and adjustment, and exact and constant order discoverable in all the parts of it. Whatever be the cause, the

[4] The following letter, signed *Misatheus*, appeared in the *Guardian*, No. 9, Saturday, March 21, 1713. Although not claimed by his son, it has been conjectured that it was written by Berkeley, referring as it does to the preceding Essay, and suggesting a new argument on the same subject:—

'To the *Guardian*.

'March 16.

'SIR,—By your paper of Saturday last you give the town hopes that you will dedicate that day to religion. You could not begin it better than by warning your pupils of the poison vended under a pretence to free-thinking. If you can spare room in your next Saturday's paper for a few lines on the same subject, these are at your disposal.

'I happened to be present at a public conversation of some of the defenders of this *Discourse of Free-thinking*, and others that differed from them; where I had the diversion of hearing the same man in one breath persuade us to freedom of thought, and in the next offer to demonstrate that we had no freedom in anything. One would think men should blush to find themselves entangled in a greater contradiction than any the *Discourse* ridicules. This principle of free fatality or necessary liberty is a worthy fundamental of the new sect; and indeed this opinion is an evidence and clearness so nearly related to Transubstantiation that the same genius seems requisite for either. It is fit the world should know how far reason abandons men that would employ it against religion; which intention, I hope, justifies this trouble from,

SIR,
Your hearty well-wisher,
MISATHEUS.'

Berkeley alludes in various parts of his works to his personal knowledge of the free-thinking clubs of London. Cf. *Alciphron*, Dial. VII. sect. 23 with the latter part of this letter.

[5] *Guardian*, No. 27, Saturday, April 11, 1713.

[6] Easter.

thing itself is evident to all our faculties. Look into the animal system, the passions, senses, and locomotive powers;—is not the like contrivance and propriety observable in these too? Are they not fitted to certain ends, and are they not by nature directed to proper objects?

Is it possible then that the smallest bodies should, by a management superior to the wit of man, be disposed in the most excellent manner agreeable to their respective natures; and yet the spirits or souls of men be neglected, or managed by such rules as fall short of man's understanding? Shall every other passion be rightly placed by nature, and shall that appetite of Immortality, natural to all mankind, be alone misplaced, or designed to be frustrated? Shall the industrious application of the inferior animal powers in the meanest vocations be answered by the ends we propose, and shall not the generous efforts of a virtuous mind be rewarded? In a word, shall the corporeal world be all order and harmony, the intellectual discord and confusion? He who is bigot enough to believe these things must bid adieu to that natural rule of 'reasoning from analogy;' must run counter to that maxim of common sense, 'That men ought to form their judgments of things unexperienced from what they have experienced.'

If any thing looks like a recompence of calamitous virtue on this side the grave, it is either an assurance that thereby we obtain the favour and protection of heaven, and shall, whatever befals us in this, in another life meet with a just return; or else that applause and reputation which is thought to attend virtuous actions. The former of these, our free-thinkers, out of their singular wisdom and benevolence to mankind, endeavour to erase from the minds of men. The latter can never be justly distributed in this life, where so many ill actions are reputable, and so many good actions disesteemed or misinterpreted; where subtle hypocrisy is placed in the most engaging light, and modest virtue lies concealed; where the heart and the soul are hid from the eyes of men, and the eyes of men are dimmed and vitiated. Plato's sense in relation to this point is contained in his Gorgias, where he introduces Socrates speaking after this manner:—

'It was in the reign of Saturn provided by a law, which the gods have since continued down to this time, That they who had lived virtuously and piously upon earth, should after death enjoy

a life full of happiness, in certain islands appointed for the habitation of the blessed: but that such as have lived wickedly should go into the receptacle of damned souls, named Tartarus, there to suffer the punishments they deserved. But in all the reign of Saturn, and in the beginning of the reign of Jove, living judges were appointed, by whom each person was judged in his life-time in the same day on which he was to die. The consequence of which was, that they often passed wrong judgments. Pluto, therefore, who presided in Tartarus, and the guardians of the blessed islands, finding that on the other side many unfit persons were sent to their respective dominions, complained to Jove, who promised to redress the evil. He added, the reason of these unjust proceedings are that men are judged in the body. Hence many conceal the blemishes and imperfections of their minds by beauty, birth and riches; not to mention that at the time of trial there are crowds of witnesses to attest their having lived well. These things mislead the judges, who being themselves also of the number of the living, are surrounded each with his own body, as with a veil thrown over his mind. For the future, therefore, it is my intention that men do not come on their trial till after death, when they shall appear before the judge, disrobed of all their corporeal ornaments. The judge himself too shall be a pure unveiled spirit, beholding the very soul, the naked soul of the party before him. With this view I have already constituted my sons, Minos and Rhadamanthus, judges, who are natives of Asia; and Æachus, a native of Europe. These, after death, shall hold their court in a certain meadow, from which there are two roads, leading the one to Tartarus, the other to the islands of "the blessed."'

From this, as from numberless other passages of his writings, may be seen Plato's opinion of a Future State. A thing therefore in regard to us so comfortable, in itself so just and excellent, a thing so agreeable to the analogy of nature, and so universally credited by all orders and ranks of men, of all nations and ages, what is it that should move a few men to reject? Surely there must be something of prejudice in the case. I appeal to the secret thoughts of a Free-thinker, if he does not argue within himself after this manner:—The senses and faculties I enjoy at present are visibly designed to repair or preserve the body from

the injuries it is liable to in its present circumstances: but in an eternal state, where no decays are to be repaired, no outward injuries to be fenced against, where there are no flesh and bones, nerves or blood-vessels, there will certainly be none of the senses: and that there should be a state of life without the senses is inconceivable.

But as this manner of reasoning proceeds from a poverty of imagination and narrowness of soul in those that use it, I shall endeavour to remedy those defects, and open their views, by laying before them a case which, being naturally possible, may perhaps reconcile them to the belief of what is supernaturally revealed.

Let us suppose a person blind and deaf from his birth, who, being grown to man's estate, is, by the dead palsy or some other cause, deprived of his feeling, tasting, and smelling, and at the same time has the impediment of his hearing removed, and the film taken from his eyes. What the five senses are to us, that the touch, taste and smell were to him. And any other ways of perception, of a more refined and extensive nature, were to him as inconceivable as to us those are which will one day be adapted to perceive those things which 'eye hath not seen, nor ear heard, neither hath it entered into the heart of man to conceive.' And it would be just as reasonable in him to conclude, that the loss of those three senses could not possibly be succeeded by any new inlets of perception, as in a modern Free-thinker to imagine there can be no state of life and perception without the senses he enjoys at present. Let us further suppose the same person's eyes, at their first opening, to be struck with a great variety of the most gay and pleasing objects, and his ears with a melodious consort of vocal and instrumental music. Behold him amazed, ravished, transported; and you have some distant representation, some faint and glimmering idea of the ecstatic state of the soul in that article in which she emerges from this sepulchre of flesh into Life and Immortality.

N. B. It has been observed by the Christians, that a certain ingenious foreigner[7], who has published many exemplary jests for

[7] M. Deslandes, a French Free-thinker (born 1690—died 1757), who came about this time to England. See p. 157.

the use of persons in the article of death, was very much out of humour in a late fit of sickness, till he was in a fair way of recovery.

III.

A VISIT TO THE PINEAL GLAND[8].

O vitæ philosophia dux, virtutis indagatrix!—CICERO.

O philosophy, thou guide of life, and discoverer of virtue!

To NESTOR IRONSIDE, Esq.

SIR,

'I am a man who have spent great part of that time in rambling through foreign countries which young gentlemen usually pass at the university; by which course of life, although I have acquired no small insight into the manners and conversation of men, yet I could not make proportionable advances in the way of science and speculation. In my return through France, as I was one day setting forth this my case to a certain gentleman of that nation with whom I had contracted a friendship, after some pause, he conducted me into his closet, and, opening a little amber cabinet, took from thence a small box of Snuff, which he said was given him by an uncle of his, the author of 'The Voyage to the World of Descartes;' and, with many professions of gratitude and affection, made me a present of it—telling me at the same time, that he knew no readier way to furnish and adorn a mind with knowledge in the arts and sciences than that same Snuff rightly applied.

'You must know, said he, that Descartes was the first who discovered a certain part of the brain, called by anatomists the Pineal Gland, to be the immediate receptacle of the soul, where she is affected with all sorts of perceptions, and exerts all her operations by the intercourse of the animal spirits which run through the nerves that are thence extended to all parts of the body. He added, that the same philosopher having considered the body as a machine or piece of clockwork, which performed all the vital

[8] *Guardian*, No. 35, Tuesday, April 21, 1713.

operations without the concurrence of the will, began to think a way may be found out for separating the soul for some time from the body, without any injury to the latter; and that, after much meditation on that subject, the above-mentioned virtuoso composed the Snuff he then gave me; which, if taken in a certain quantity, would not fail to disengage my soul from my body. Your soul (continued he) being at liberty to transport herself with a thought wherever she pleases, may enter into the Pineal Gland of the most learned philosopher; and, being so placed, become spectator of all the ideas in his mind, which would instruct her in a much less time than the usual methods. I returned him thanks, and accepted his present, and with it a paper of directions.

'You may imagine it was no small improvement and diversion to pass my time in the Pineal Glands of philosophers, poets, beaux, mathematicians, ladies, and statesmen. One while, to trace a theorem in mathematics through a long labyrinth of intricate turns and subtleties of thought; another, to be conscious of the sublime ideas and comprehensive views of a philosopher, without any fatigue or wasting of my own spirits. Sometimes, to wander through perfumed groves, or enamelled meadows, in the fancy of a poet: at others, to be present when a battle or a storm raged, or a glittering palace rose in his imagination; or to behold the pleasures of a country life, the passion of a generous love, or the warmth of devotion wrought up to rapture. Or (to use the words of a very ingenious author) to

> "Behold the raptures which a writer knows,
> When in his breast a vein of fancy glows,
> Behold his business while he works the mine.
> Behold his temper when he sees it shine[9]."

'These gave me inconceivable pleasure. Nor was it an unpleasant entertainment sometimes to descend from these sublime and magnificent ideas to the impertinences of a beau, the dry schemes of a coffee-house politician, or the tender images in the mind of a young lady. And as, in order to frame a right idea of human happiness, I thought it expedient to make a trial of the various manners wherein men of different pursuits were affected; I one day entered into the Pineal Gland of a certain person who

[9] *Essay on the Different Styles of Poetry*—[AUTHOR.] This poem was published anonymously in 1713.

seemed very fit to give me an insight into all that which constitutes the happiness of him who is called 'a man of pleasure.' But I found myself not a little disappointed in my notion of the pleasures which attend a voluptuary, who has shaken off the restraints of reason.

'His intellectuals, I observed, were grown unserviceable by too little use, and his senses were decayed and worn out by too much. That perfect inaction of the higher powers prevented appetite in prompting him to sensual gratifications; and the outrunning natural appetite produced a loathing instead of a pleasure. I there beheld the intemperate cravings of youth, without the enjoyments of it; and the weakness of old age, without its tranquillity. When the passions were teazed and roused by some powerful object, the effect was, not to delight or sooth the mind, but to torture it between the returning extremes of appetite and satiety. I saw a wretch racked, at the same time, with a painful remembrance of past miscarriages, a distaste of the present objects that solicit his senses, and a secret dread of futurity. And I could see no manner of relief or comfort in the soul of this miserable man, but what consisted in preventing his cure, by inflaming his passions and suppressing his reason. But, though it must be owned he had almost quenched that light which his Creator had set up in his soul, yet in spite of all his efforts, I observed at certain seasons frequent flashes of remorse strike through the gloom, and interrupt that satisfaction he enjoyed in hiding his own deformities from himself.

'I was also present at the original formation or production of a certain book in the mind of a Free-thinker, and, believing it may be not unacceptable to let you into the secret manner and internal principles by which that *phænomenon* was formed, I shall in my next give you an account of it. I am, in the mean time,

'Your most obedient humble servant,

'Ulysses Cosmopolita.'

'N. B. Mr. Ironside has lately received out of France ten pound avoirdupois weight of this philosophical Snuff, and gives notice that he will make use of it, in order to distinguish the real from the professed sentiments of all persons of eminence in court, city, town, and country.'

IV.

THE PINEAL GLAND OF A FREE-THINKER[10].

———Ægri somnia.—Hor. *Ars Poet.* v. 7.
A sick man's dreams.

My correspondent, who has acquired the faculty of entering into other men's thoughts, having, in pursuance to a former letter, sent me an account of certain useful discoveries he has made by the help of that invention, I shall communicate the same to the publick in this paper.

Mr. Ironside,

'On the 11th day of October, in the year 1712, having left my body locked up safe in my study, I repaired to the Grecian coffee-house, where, entering into the Pineal Gland of a certain eminent Free-thinker, I made directly to the highest part of it, which is the seat of the Understanding, expecting to find there a comprehensive knowledge of all things human and divine; but, to my no small astonishment, I found the place narrower than ordinary, insomuch that there was not any room for a miracle, prophecy, or separate spirit.

'This obliged me to descend a story lower, into the Imagination, which I found larger, indeed, but cold and comfortless. I discovered Prejudice in the figure of a woman standing in a corner, with her eyes close shut, and her fore-fingers stuck in her ears; many words in a confused order, but spoken with great emphasis, issued from her mouth. These being condensed by the coldness of the place, formed a sort of mist, through which methought I saw a great castle with a fortification cast round it, and a tower adjoining to it that through the windows appeared to be filled with racks and halters. Beneath the castle I could discern vast dungeons, and all about it lay scattered the bones of men. It seemed to be garrisoned by certain men in black, of gigantick size, and most terrible forms. But, as I drew near, the terror of the appearance vanished; and the castle I found to be only a

[10] *Guardian*, No. 39, April 25. 1713.

church, whose steeple with its clock and bell ropes was mistaken for a tower filled with racks and halters. The terrible Giants in black shrunk into a few innocent clergymen. The dungeons were turned into vaults designed only for the habitation of the dead; and the fortifications proved to be a churchyard, with some scattered bones in it, and a plain stone wall round it.

'I had not been long here before my curiosity was raised by a loud noise that I heard in the inferior region. Descending thither I found a mob of the Passions assembled in a riotous manner. Their tumultuary proceedings soon convinced me, that they affected a democracy. After much noise and wrangle, they at length all hearkened to Vanity, who proposed the raising of a great army of notions, which she offered to lead against those dreadful phantoms in the imagination that had occasioned all this uproar.

'Away posted Vanity, and I after her, to the storehouse of ideas; where I beheld a great number of lifeless notions confusedly thrown together, but upon the approach of Vanity they began to crawl. Here were to be seen, among other odd things, sleeping deities, corporeal spirits, and worlds formed by chance; with an endless variety of heathen notions, the most irregular and grotesque imaginable. And with these were jumbled several of Christian extraction; but such was the dress and light they were put in, and their features were so distorted, that they looked little better than heathens. There was likewise assembled no small number of phantoms in strange habits, who proved to be idolatrous priests of different nations. Vanity gave the word, and straightway the Talopoins, Faquirs, Bramines and Bonzes drew up in a body. The right wing consisted of ancient heathen notions, and the left of Christians naturalized. All these together, for numbers, composed a very formidable army; but the precipitation of Vanity was so great, and such was their own inbred aversion to the tyranny of rules and discipline, that they seemed rather a confused rabble than a regular army. I could, nevertheless, observe, that they all agreed in a squinting look, or cast of their eyes towards a certain person in a mask, who was placed in the centre, and whom by sure signs and tokens I discovered to be Atheism.

'Vanity had no sooner led her forces into the Imagination, but she resolved upon storming the castle, and giving no quarter.

They began the assault with a loud outcry and great confusion. I, for my part, made the best of my way and re-entered my own lodging. Some time after, inquiring at a bookseller's for *A Discourse on Free-thinking,* which had made some noise, I met with the representatives of all those notions drawn up in the same confused order upon paper. Sage Nestor, I am

'Your most obedient humble servant,

Ulysses Cosmopolita.'

'N. B. I went round the table, but could not find a wit or mathematician among them.'

I imagine the account here given may be useful in directing to the proper cure of a Free-thinker. In the first place, it is plain his Understanding wants to be opened and enlarged, and he should be taught the way to order and methodise his ideas; to which end the study of the mathematics may be useful. I am farther of opinion, that as his Imagination is filled with amusements, arising from prejudice, and the obscure or false lights in which he sees things, it will be necessary to bring him into good company, and now and then carry him to church; by which means he may in time come to a right sense of religion, and wear off the ill impressions he has received. Lastly, I advise whoever undertakes the reformation of a modern Free-thinker, that above all things he be careful to subdue his Vanity; that being the principal motive which prompts a little genius to distinguish itself by singularities that are hurtful to mankind.

Or, if the passion of Vanity, as it is for the most part very strong in your Free-thinkers, cannot be subdued, let it be won over to the interest of religion, by giving them to understand that the greatest *Genii* of the age have a respect for things sacred; that their rhapsodies find no admirers, and that the name Free-thinker has, like Tyrant of old, degenerated from its original signification, and is now supposed to denote something contrary to wit and reason. In fine, let them know that whatever temptations a few men of parts might formerly have had, from the novelty of the thing, to oppose the received opinions of Christians, yet that now the humour is worn out, and blasphemy and irreligion

are distinctions which have long since descended down to lackeys and drawers.

But it must be my business to prevent all pretenders in this kind from hurting the ignorant and unwary. In order to this, I communicated an intelligence which I received of a gentleman's appearing very sorry that he was not well during a late fit of sickness, contrary to his own doctrine, which obliged him to be merry upon that occasion, except he was sure of recovering. Upon this advice to the world, the following advertisement got a place in the *Post-boy*:—

'WHEREAS in the paper called the *Guardian*, of Saturday the 11th of April instant, a corollary reflection was made on Monsieur D———, a member of the royal academy of sciences in Paris, author of a book lately published, entitled,

"A Philological Essay, or Reflexions on the death of Free-thinkers, with the characters of the most eminent persons of both sexes, ancient and modern, that died pleasantly and unconcerned, &c.;" sold by J. Baker in Pater-noster-Row—suggesting as if that gentleman, now in London, "was very much out of humour, in a late fit of sickness, till he was in a fair way of recovery:"—this is to assure the public, that the said gentleman never expressed the least concern at the approach of death, but expected the fatal minute with a most heroical and philosophical resignation; of which a copy of verses he wrote, in the serene intervals of his distemper, is an invincible proof.'

All that I contend for is, that this gentleman[11] was out of humour when he was sick; and the advertiser, to confute me, says, that 'in the serene intervals of his distemper,' that is, when he was not sick, he wrote verses. I shall not retract my advertisement till I see those verses, and I will choose what to believe then, except they are underwritten by his nurse, nor then neither, except she is an house-keeper. I must tie this gentleman close to the argument; for, if he had not actually his fit upon him, there is nothing courageous in the thing, nor does it make for his purpose, nor are they heroic verses.

[11] M. Deslandes; cf. p. 150. His *Reflexions sur les Grands Hommes qui sont mort en plaisantant*, was published in London in 1713, and translated into English by Boyer, under the above title. Deslandes is also author of the *Literatum Otium*, referred to p. 158, and of a *Histoire Critique de la Philosophie*, which appeared in 1741.

The point of being merry at the hour of death is a matter that ought to be settled by divines; but the publisher of the *Philological Essay* produces his chief authorities from Lucretius, the earl of Rochester, and Mr. John Dryden, who were gentlemen that did not think themselves obliged to prove all they said, or else proved their assertions, by saying or swearing they were all fools that believed to the contrary. If it be absolutely necessary that a man should be facetious at his death, it would be very well if these gentlemen, monsieur D—— and Mr. B——[12], would repent betimes, and not trust to a death-bed ingenuity; by what has appeared hitherto, they have only raised our longing to see their posthumous works.

The author of *Poetæ Rusticantis Literatum Otium* is but a mere phraseologist; the philological publisher is but a translator; but I expected better usage from Mr. Abel Roper who is an original.

V.

PLEASURES, NATURAL AND FANTASTICAL[13].

——quæ possit facere & servare beatum.
Hor. *Ep.* 6. l. 1. v. 2.
To make men happy, and to keep them so.—Creech.

It is of great use to consider the Pleasures which constitute human happiness, as they are distinguished into natural and fantastical. Natural pleasures I call those, which, not depending on the fashion and caprice of any particular age or nation, are suited to human nature in general, and were intended by Providence as rewards for the using our faculties agreeably to the ends for which they were given us. Fantastical pleasures are those which, having no natural fitness to delight our minds, presuppose some particular whim or taste accidentally prevailing in a set of people, to which it is owing that they please.

Now, I take it that the tranquillity and cheerfulness with which I have passed my life are the effect of having, ever since I came to years of discretion, continued my inclinations to the former sort of pleasures. But, as my experience can be a rule only to my

[12] Conjectured to be Mr. Budgell.

[13] *Guardian*, No. 49, Thursday, May 7, 1713.

own actions, it may probably be a stronger motive to induce others to the same scheme of life, if they would consider that we are prompted to natural pleasures by an instinct impressed on our minds by the Author of our nature, who best understands our frames, and consequently best knows what those pleasures are, which will give us the least uneasiness in the pursuit, and the greatest satisfaction in the enjoyment of them. Hence it follows that the objects of our natural desires are cheap or easy to be obtained; it being a maxim that holds throughout the whole system of created beings, 'that, nothing is made in vain,' much less the instincts and appetites of animals, which the benevolence as well as wisdom of the Deity is concerned to provide for. Nor is the fruition of those objects less pleasing than the acquisition is easy; and the pleasure is heightened by the sense of having answered some natural end, and the consciousness of acting in concert with the Supreme Governor of the universe.

Under natural pleasures I comprehend those which are universally suited as well to the rational as the sensual part of our nature. And, of the pleasures which affect our senses, those only are to be esteemed natural that are contained within the rules of reason, which is allowed to be as necessary an ingredient of human nature as sense. And, indeed, excesses of any kind are hardly to be esteemed pleasures, much less natural pleasures.

It is evident that a desire terminated in money is fantastical; so is the desire of outward distinctions, which bring no delight of sense, nor recommend us as useful to mankind; and the desire of things merely because they are new or foreign. Men who are indisposed to a due exertion of their higher parts are driven to such pursuits as these from the restlessness of the mind, and the sensitive appetites being easily satisfied. It is, in some sort, owing to the bounty of Providence that, disdaining a cheap and vulgar happiness, they frame to themselves imaginary goods, in which there is nothing can raise desire, but the difficulty of obtaining them. Thus men become the contrivers of their own misery; as a punishment on themselves for departing from the measures of nature. Having by an habitual reflection on these truths made them familiar, the effect is, that I, among a number of persons who have debauched their natural taste, see things in a peculiar light; which I have arrived at, not by any uncommon

force of genius or acquired knowledge, but only by unlearning the false notions instilled by custom and education.

The various objects that compose the world were by nature formed to delight our senses: and as it is this alone that makes them desirable to an uncorrupted taste, a man may be said naturally to possess them, when he possesseth those enjoyments which they are fitted by nature to yield. Hence it is usual with me to consider myself as having a natural property in every object that administers pleasure to me. When I am in the country, all the fine seats near the place of my residence, and to which I have access, I regard as mine. The same I think of the groves and fields where I walk, and muse on the folly of the civil landlord in London, who has the fantastical pleasure of *draining dry rent* into his coffers, but is a stranger to fresh air and rural enjoyments. By these principles I am possessed of half a dozen of the finest seats in England, which in the eye of the law belong to certain of my acquaintance, who being men of business choose to live near the court.

In some great families, where I choose to pass my time, a stranger would be apt to rank me with the other domestics; but, in my own thoughts and natural judgment, I am master of the house, and he who goes by that name is my steward, who eases me of the care of providing for myself the conveniencies and pleasures of life.

When I walk the streets, I use the foregoing natural maxim (viz. That he is the true possessor of a thing who enjoys it, and not he that owns it without the enjoyment of it) to convince myself that I have a property in the gay part of all the gilt chariots that I meet, which I regard as amusements designed to delight my eyes, and the imagination of those kind people who sit in them gaily attired only to please me. I have a real, and they only an imaginary pleasure from their exterior embellishments. Upon the same principle, I have discovered that I am the natural proprietor of all the diamond necklaces, the crosses, stars, brocades, and embroidered clothes which I see at a play or birth-night, as giving more natural delight to the spectator than to those that wear them. And I look on the beaus and ladies as so many paraquets in an aviary, or tulips in a garden, designed purely for my diversion. A gallery of pictures, a cabinet or library that I have free access

to, I think my own. In a word, all that I desire is the use of things, let who will have the keeping of them. By which maxim I am grown one of the richest men in Great Britain; with this difference, that I am not a prey to my own cares, or the envy of others.

The same principles I find of great use in my private economy. As I cannot go to the price of history-painting, I have purchased at easy rates several beautifully designed pieces of landscape and perspective, which are much more pleasing to a natural taste than unknown faces or Dutch gambols, though done by the best masters: my couches, beds, and window-curtains are of Irish stuff, which those of that nation work very fine, and with a delightful mixture of colours[14]. There is not a piece of china in my house; but I have glasses of all sorts, and some tinged with the finest colours, which are not the less pleasing, because they are domestic, and cheaper than foreign toys. Every thing is neat, entire, and clean, and fitted to the taste of one who had rather be happy than be thought rich.

Every day, numberless innocent and natural gratifications occur to me, while I behold my fellow creatures labouring in a toilsome and absurd pursuit of trifles;—one, that he may be called by a particular appellation; another, that he may wear a particular ornament, which I regard as a bit of ribband that has an agreeable effect on my sight, but is so far from supplying the place of merit where it is not, that it serves only to make the want of it more conspicuous. Fair weather is the joy of my soul; about noon I behold a blue sky with rapture, and receive great consolation from the rosy dashes of light which adorn the clouds of the morning and evening. When I am lost among green trees, I do not envy a great man with a great crowd at his levee. And I often lay aside thoughts of going to an opera that I may enjoy the silent pleasure of walking by moonlight, or viewing the stars sparkle in their azure ground; which I look upon as part of my possessions, not without a secret indignation at the tastelessness of mortal men who, in their race through life, overlook the real enjoyments of it.

But the pleasure which naturally affects a human mind with the most lively and transporting touches, I take to be the sense that

[14] Cf. *Querist*, Qu. 64—69.

we act in the eye of infinite wisdom, power, and goodness, that will crown our virtuous endeavours here with a happiness hereafter, large as our desires, and lasting as our immortal souls. This is a perpetual spring of gladness in the mind. This lessens our calamities, and doubles our joys. Without this the highest state of life is insipid, and with it the lowest is a paradise. What unnatural wretches then are those who can be so stupid as to imagine a merit, in endeavouring to rob virtue of her support, and a man of his present as well as future bliss? But as I have frequently taken occasion to animadvert on that species of mortals, so I propose to repeat my animadversions on them, till I see some symptoms of amendment.

VI.

FUTURE REWARDS AND PUNISHMENTS[15].

———quis enim virtutem amplectitur ipsam,
Præmia si tollas? ——— Juv. *Sat.* 10. v. 141.

For who would virtue for herself regard,
Or wed, without the portion of reward?—Dryden.

It is usual with polemical writers to object ill designs to their adversaries. This turns their argument into satire, which, instead of shewing an error in the understanding, tends only to expose the morals of those they write against. I shall not act after this manner with respect to the Free-thinkers. Virtue, and the happiness of society are the great ends which all men ought to promote, and some of that sect would be thought to have at heart above the rest of mankind. But, supposing those who make that profession to carry on a good design in the simplicity of their hearts, and according to their best knowledge, yet it is much to be feared, those well-meaning souls, while they endeavoured to recommend virtue, have in reality been advancing the interests of vice, which as I take to proceed from their ignorance of human nature, we

[15] *Guardian*, No. 55, Thursday, May 14, 1713.—Cf. *Alciphron*, Dial. III.

may hope, when they become sensible of their mistake, they will, in consequence of that beneficent principle they pretend to act upon, reform their practice for the future.

The sages whom I have in my eye speak of virtue as the most amiable thing in the world; but, at the same time that they extol her beauty, they take care to lessen her portion. Such innocent creatures are they, and so great strangers to the world, that they think this a likely method to increase the number of her admirers.

Virtue has in herself the most engaging charms; and Christianity, as it places her in the strongest light, and adorned with all her native attractions, so it kindles a new fire in the soul, by adding to them the unutterable rewards which attend her votaries in an eternal state. Or if there are men of a saturnine and heavy complexion, who are not easily lifted up by hope, there is the prospect of everlasting punishments to agitate their souls, and frighten them into the practice of virtue and an aversion from vice.

Whereas your sober Free-thinkers tell you, that virtue indeed is beautiful, and vice deformed; the former deserves your love, and the latter your abhorrence;—but then, it is for their own sake, or on account of the good and evil which immediately attend them, and are inseparable from their respective natures. As for the immortality of the soul, or eternal punishments and rewards, those are openly ridiculed, or rendered suspicious by the most sly and laboured artifice.

I will not say, these men act treacherously in the cause of virtue; but will any one deny that they act foolishly who pretend to advance the interest of it by destroying or weakening the strongest motives to it, which are accommodated to all capacities, and fitted to work on all dispositions, and enforcing those alone which can affect only a generous and exalted mind?

Surely they must be destitute of passion themselves, and unacquainted with the force it hath on the minds of others, who can imagine that the mere beauty of fortitude, temperance, and justice is sufficient to sustain the mind of man in a severe course of self-denial against all the temptations of present profit and sensuality.

It is my opinion the Free-thinkers should be treated as a set of poor ignorant creatures, that have not sense to discover the excellency of religion; it being evident those men are no witches, nor

likely to be guilty of any deep design, who proclaim aloud to the world that they have less motives to honesty than the rest of their fellow-subjects; who have all the inducements to the exercise of any virtue which a Free-thinker can possibly have, and besides the expectation of never-ending happiness or misery as the consequence of their choice.

Are not men actuated by their passions, and are not hope and fear the most powerful of our passions? And are there any objects which can rouse and awaken our hopes and fears, like those prospects that warm and penetrate the heart of a Christian, but are not regarded by a Free-thinker?

It is not only a clear point that a Christian breaks through stronger engagements whenever he surrenders himself to commit a criminal action, and is stung with a sharper remorse after it, than a Free-thinker; but it should even seem that a man who believes no future state, would act a foolish part in being thoroughly honest. For what reason is there why such a one should postpone his own private interest or pleasure to the doing his duty? If a Christian foregoes some present advantage for the sake of his conscience, he acts accountably, because it is with the view of gaining some greater future good. But he that, having no such view, should yet conscientiously deny himself a present good in any incident where he may save appearances is altogether as stupid as he that would trust him at such a juncture.

It will, perhaps, be said that virtue is her own reward, that a natural gratification attends good actions, which is alone sufficient to excite men to the performance of them. But although there is nothing more lovely than virtue, and the practice of it is the surest way to solid natural happiness even in this life; yet titles, estates, and fantastical pleasures are more ardently sought after by most men than the natural gratifications of a reasonable mind; and it cannot be denied that virtue and innocence are not always the readiest methods to attain that sort of happiness. Besides, the fumes of passion must be allayed, and reason must burn brighter than ordinary, to enable men to see and relish all the native beauties and delights of a virtuous life. And though we should grant our Free-thinkers to be a set of refined spirits, capable only of being enamoured of virtue, yet what would become of the bulk of mankind who have gross understandings, but lively

senses and strong passions? What a deluge of lust and fraud and violence would in a little time overflow the whole nation if these wise advocates for morality were universally hearkened to? Lastly, opportunities do sometimes offer in which a man may wickedly make his fortune, or indulge a pleasure, without fear of temporal damage, either in reputation, health, or fortune. In such cases, what restraint do they lie under who have no regards beyond the grave? the inward compunctions of a wicked, as well as the joys of an upright mind, being grafted on the sense of another state.

The thought, 'that our existence terminates with this life,' doth naturally check the soul in any generous pursuit, contract her views, and fix them on temporary and selfish ends. It dethrones the reason, extinguishes all noble and heroic sentiments, and subjects the mind to the slavery of every present passion. The wise heathens of antiquity were not ignorant of this; hence they endeavoured by fables and conjectures, and the glimmerings of nature, to possess the minds of men with the belief of a future state, which has been since brought to light by the Gospel, and is now most inconsistently decried by a few weak men, who would have us believe that they promote virtue by turning religion into ridicule.

VII.

THOUGHTS ON PUBLIC SCHOOLS AND UNIVERSITIES[16].

O fortunatos nimiùm, sua si bona nôrint!
VIRG. *Georg.* 2. v. 458.
Too happy, if they knew their happy state.

UPON the late election of king's scholars, my curiosity drew me to Westminster School. The sight of a place where I had not been for many years revived in my thoughts the tender images of my childhood, which by a great length of time had contracted a softness that rendered them inexpressibly agreeable. As it is

[16] *Guardian*, No. 62, Friday, May 22, 1713.

usual with me to draw a secret unenvied pleasure from a thousand incidents overlooked by other men, I threw myself into a short transport, forgetting my age, and fancying myself a school-boy.

This imagination was strongly favoured by the presence of so many young boys, in whose looks were legible the sprightly passions of that age, which raised in me a sort of sympathy. Warm blood thrilled through every vein; the faded memory of those enjoyments that once gave me pleasure put on more lively colours, and a thousand gay amusements filled my mind.

It was not without regret that I was forsaken by this waking dream. The cheapness of puerile delights, the guiltless joy they leave upon the mind, the blooming hopes that lift up the soul in the ascent of life, the pleasure that attends the gradual opening of the imagination and the dawn of reason, made me think most men found that stage the most agreeable part of their journey.

When men come to riper years, the innocent diversions which exalted the spirits, and produced health of body, indolence of mind, and refreshing slumbers, are too often exchanged for criminal delights which fill the soul with anguish and the body with disease. The grateful employment of admiring and raising themselves to an imitation of the polite style, beautiful images, and noble sentiments of ancient authors, is abandoned for law-Latin, the lucubrations of our paltry newsmongers, and that swarm of vile pamphlets which corrupt our taste, and infest the public. The ideas of virtue which the characters of heroes had imprinted on their minds insensibly wear out, and they come to be influenced by the nearer examples of a degenerate age.

In the morning of life, when the soul first makes her entrance into the world, all things look fresh and gay; their novelty surprises, and every little glitter or gaudy colour transports the stranger. But by degrees the sense grows callous, and we lose that exquisite relish of trifles, by the time our minds should be supposed ripe for rational entertainments. I cannot make this reflection without being touched with a commiseration of that species called Beaus, the happiness of those men necessarily terminating with their childhood; who, from a want of knowing other pursuits, continue a fondness for the delights of that age after the relish of them is decayed.

Providence hath with a bountiful hand prepared variety of

pleasures for the various stages of life. It behoves us not to be wanting to ourselves, in forwarding the intention of nature, by the culture of our minds, and a due preparation of each faculty for the enjoyment of those objects it is capable of being affected with.

As our parts open and display by gentle degrees, we rise from the gratifications of sense to relish those of the mind. In the scale of pleasure, the lowest are sensual delights, which are succeeded by the more enlarged views and gay portraitures of a lively imagination; and these give way to the sublimer pleasures of reason, which discover the causes and designs, the frame, connection, and symmetry of things, and fill the mind with the contemplation of intellectual beauty, order, and truth.

Hence I regard our public schools and universities, not only as nurseries of men for the service of the church and state, but also as places designed to teach mankind the most refined luxury, to raise the mind to its due perfection, and give it a taste for those entertainments which afford the highest transport, without the grossness or remorse that attend vulgar enjoyments.

In those blessed retreats men enjoy the sweets of solitude, and yet converse with the greatest *Genii* that have appeared in every age, wander through the delightful mazes of every art and science, and as they gradually enlarge their sphere of knowledge, at once rejoice in their present possessions, and are animated by the boundless prospect of future discoveries. *There* a generous emulation, a noble thirst of fame, a love of truth and honourable regards, reign in minds as yet untainted from the world. *There* the stock of learning transmitted down from the ancients is preserved, and receives a daily increase; and it is *thence* propagated by men who, having finished their studies, go into the world, and spread that general knowledge and good taste throughout the land, which is so distant from the barbarism of its ancient inhabitants, or the first genius of its invaders. And as it is evident that our literature is owing to the schools and universities so it cannot be denied that these are owing to our religion.

It was chiefly, if not altogether, upon religious considerations that princes, as well as private persons, have erected Colleges, and assigned liberal endowments to students and professors. Upon

the same account they meet with encouragement and protection from all christian states, as being esteemed a necessary means to have the sacred oracles and primitive traditions of Christianity preserved and understood. And it is well known that, after a long night of ignorance and superstition, the reformation of the church and that of learning began together, and made proportionable advances, the latter having been the effect of the former, which of course engaged men in the study of the learned languages and of antiquity.

Or, if a Free-thinker is ignorant of these facts, he may be convinced from the manifest reason of the thing. Is it not plain that our skill in literature is owing to the knowledge of Greek and Latin, which, that they are still preserved among us, can be ascribed only to a religious regard? What else should be the cause why the youth of Christendom, above the rest of mankind, are educated in the painful study of those dead languages, and that religious societies should peculiarly be employed in acquiring that sort of knowledge, and teaching it to others?

And it is more than probable that, in case our Free-thinkers could once achieve their glorious design of sinking the credit of the christian religion, and causing those revenues to be withdrawn which their wiser forefathers had appointed to the support and encouragement of its teachers, in a little time the Shaster would be as intelligible as the Greek Testament; and we who want that spirit and curiosity which distinguished the ancient Grecians would by degrees relapse into the same state of barbarism which overspread the northern nations before they were enlightened by Christianity.

Some, perhaps, from the ill tendency and vile taste which appear in their writings, may suspect that the Free-thinkers are carrying on a malicious design against the Belles Lettres: for my part, I rather conceive them as unthinking wretches of short views and narrow capacities, who are not able to penetrate into the causes or consequences of things.

VIII.

FENELON'S DEMONSTRATION[17].

Jupiter est quodcunque vides..... —LUCAN.

Where'er you turn your eyes, 'tis God you see.

I had this morning a very valuable and kind present sent me of a translated work of a most excellent foreign writer, who makes a very considerable figure in the learned and christian world. It is entitled, 'A Demonstration of the Existence, Wisdom and Omnipotence of God, drawn from the knowledge of Nature, particularly of Man, and fitted to the meanest capacity;' by the Archbishop of Cambray, Author of Telemachus; and translated from the French by the same hand that Englished that excellent piece. This great author, in the writings which he has before produced, has manifested an heart full of virtuous sentiments, great benevolence to mankind, as well as a sincere and fervent piety towards his Creator. His talents and parts are a very great good to the world, and it is a pleasing thing to behold the polite arts subservient to religion, and recommending it from its natural beauty. Looking over the letters of my correspondents, I find one which celebrates this Treatise, and recommends it to my readers.

To the GUARDIAN.

'SIR,

'I think I have somewhere read, in the writings of one whom I take to be a friend of yours, a saying which struck me very much, and as I remember it was to this purpose: "The existence of a God is so far from being a thing that wants to be proved, that I think it is the only thing of which we are certain." This is a sprightly and just expression; however, I dare say, you will not be displeased that I put you in mind of saying something on the Demonstration of the Bishop of Cambray. A man of his talents views all things in a light different from that in which

[17] *Guardian*, No. 69, Saturday, May 30, 1713. This paper is claimed for Berkeley in the *Gent. Mag.*, 1780, p. 125. It is also attributed to Steele. The First Part of Fenelon's *Démonstration de l'Existence de Dieu*, was translated into English by Abel Boyer. London, 1713.

ordinary men see them, and the devout disposition of his soul turns all those talents to the improvement of the pleasures of a good life. His style clothes philosophy in a dress almost poetic, and his readers enjoy in full perfection the advantage, while they are reading him, of being what he is. The pleasing representation of the animal powers in the beginning of his work, and his consideration of the nature of man with the addition of reason in the subsequent discourse, impresses upon the mind a strong satisfaction in itself, and gratitude towards Him who bestowed that superiority over the brute world. These thoughts had such an effect upon the author himself that he has ended his discourse with a Prayer. This adoration has a sublimity in it befitting his character, and the emotions of his heart flow from wisdom and knowledge. I thought it would be proper for a Saturday's paper, and have translated it to make you a present of it. I have not, as the translator was obliged to do, confined myself to an exact version from the original, but have endeavoured to express the spirit of it, by taking the liberty to render his thoughts in such a way as I should have uttered them if they had been my own. It has been observed that the private letters of great men are the best pictures of their souls, but certainly their private devotions would be still more instructive, and I know not why they should not be as curious and entertaining.

'If you insert this Prayer, I know not but I may send you, for another occasion, one used by a very great wit of the last age, which has allusions to the errors of a very wild life, and I believe you will think is written with an uncommon spirit. The person whom I mean was an excellent writer, and the publication of this prayer of his may be, perhaps, some kind of antidote against the infection in his other writings. But this supplication of the bishop has in it a more happy and untroubled spirit; it is (if that is not saying something too fond) the worship of an angel concerned for those who had fallen, but himself still in the state of glory and innocence. The book ends with an act of devotion, to this effect:

'O my God! If the greater number of mankind do not discover Thee in that glorious show of Nature which Thou hast placed before our eyes, it is not because Thou art far from every one of us.

Thou art present to us more than any object which we touch with our hands; but our senses, and the passions which they produce in us, turn our attention from Thee. Thy light shines in the midst of darkness, but the darkness comprehends it not. Thou, O Lord, dost every way display thyself. Thou shinest in all Thy works, but art not regarded by heedless and unthinking man. The whole creation talks aloud of Thee, and echoes with the repetitions of Thy holy name. But such is our insensibility that we are deaf to the great and universal voice of nature. Thou art every where about us and within us; but we wander from ourselves, become strangers to our own souls, and do not apprehend Thy presence. O Thou who art the eternal fountain of light and beauty, who art the ancient of days, without beginning and without end; O Thou, who art the life of all that truly live, those can never fail to find Thee who seek for Thee within themselves. But, alas! the very gifts which Thou bestowest upon us do so employ our thoughts that they hinder us from perceiving the hand which conveys them to us. We live by Thee, and yet we live without thinking on Thee; but, O Lord, what is life in the ignorance of Thee! A dead unactive piece of matter, a flower that withers, a river that glides away, a palace that hastens to its ruin, a picture made up of fading colours, a mass of shining ore, strike our imaginations, and make us sensible of their existence. We regard them as objects capable of giving us pleasure, not considering that Thou conveyest through them all the pleasure which we imagine they give us. Such vain empty objects that are only the shadows of being, are proportioned to our low and grovelling thoughts. That beauty which Thou hast poured out on Thy creation is as a veil which hides Thee from our eyes. As Thou art a being too pure and exalted to pass through our senses, Thou art not regarded by men, who have debased their nature, and have made themselves like the beasts that perish. So infatuated are they, that, notwithstanding they know what is wisdom and virtue, which have neither sound, nor colour, nor smell, nor taste, nor figure, nor any other sensible quality, they can doubt of Thy existence, because Thou art not apprehended by the grosser organs of sense. Wretches that we are! we consider shadows as realities, and truth as a phantom. That which is nothing is all to us, and that which is all appears to us nothing. What do we see in all

nature but Thee, O my God! Thou, and only Thou, appearest in every thing. When I consider Thee, O Lord, I am swallowed up and lost in contemplation of Thee. Every thing besides thee, even my own existence, vanishes and disappears in the contemplation of Thee. I am lost to myself and fall into nothing when I think on Thee. The man who does not see Thee has beheld nothing; he who does not taste Thee, has a relish of nothing. His being is vain, and his life but a dream. Set up Thyself, O Lord, set up Thyself that we may behold Thee. As wax consumes before the fire, and as the smoke is driven away, so let thine enemies vanish out of thy presence. How unhappy is that soul who, without the sense of Thee, has no God, no hope, no comfort to support him! But how happy the man who searches, sighs, and thirsts after Thee! But he only is fully happy on whom Thou liftest up the light of Thy countenance, whose tears Thou hast wiped away, and who enjoys in Thy loving-kindness the completion of all his desires. How long, how long, O Lord, shall I wait for that day when I shall possess, in Thy presence, fulness of joy and pleasures for evermore! O my God, in this pleasing hope, my bones rejoice and cry out, Who is like unto Thee! My heart melts away, and my soul faints within me, when I look up to Thee who art the God of my life, and my portion to all eternity.'

IX.

NARROWNESS OF FREE-THINKERS[18].

——mentisque capacius altae.—Ovid. *Met.* l. 1. v. 76.

Of thoughts enlarg'd, and more exalted mind.

As I was the other day taking a solitary walk in St. Paul's, I indulged my thoughts in the pursuit of a certain analogy between that fabric and the Christian Church in the largest sense. The divine order and economy of the one seemed to be emblematically set forth by the just, plain, and majestic architecture of the other. And as the one consists of a great variety of parts united in the same regular design, according to the truest art, and most exact

[18] *Guardian*, No. 70, Monday, June 1, 1713.

proportion; so the other contains a decent subordination of members, various sacred institutions, sublime doctrines, and solid precepts of morality digested into the same design, and with an admirable concurrence tending to one view, the happiness and exaltation of human nature.

In the midst of my contemplation, I beheld a fly upon one of the pillars; and it straightway came into my head, that this same fly was a Free-thinker. For it required some comprehension in the eye of the spectator, to take in at one view the various parts of the building, in order to observe their symmetry and design. But to the fly, whose prospect was confined to a little part of one of the stones of a single pillar, the joint beauty of the whole or the distinct use of its parts were inconspicuous, and nothing could appear but small inequalities in the surface of the hewn stone, which in the view of that insect seemed so many deformed rocks and precipices.

The thoughts of a Free-thinker are employed on certain minute particularities of religion, the difficulty of a single text, or the unaccountableness of some step of Providence or point of doctrine to his narrow faculties, without comprehending the scope and design of Christianity, the perfection to which it raiseth human nature, the light it hath shed abroad in the world, and the close connection it hath as well with the good of public societies as with that of particular persons.

This raised in me some reflections on that frame or disposition which is called 'largeness of mind,' its necessity towards forming a true judgment of things, and, where the soul is not incurably stinted by nature, what are the likeliest methods to give it enlargement.

It is evident that Philosophy doth open and enlarge the mind by the general views to which men are habituated in that study, and by the contemplation of more numerous and distant objects than fall within the sphere of mankind in the ordinary pursuits of life. Hence it comes to pass that philosophers judge of most things very differently from the vulgar. Some instances of this may be seen in the Theætetus of Plato, where Socrates makes the following remarks, among others of the like nature:—

'When a philosopher hears ten thousand acres mentioned as a great estate, he looks upon it as an inconsiderable spot, having

been used to contemplate the whole globe of earth. Or when he beholds a man elated with the nobility of his race because he can reckon a series of seven rich ancestors, the philosopher thinks him a stupid ignorant fellow, whose mind cannot reach to a general view of human nature, which would shew him that we have all innumerable ancestors, among whom are crowds of rich and poor, kings and slaves, Greeks and Barbarians.' Thus far Socrates, who was accounted wiser than the rest of the Heathens for notions which approach the nearest to Christianity.

As all parts and branches of Philosophy, or speculative knowledge, are useful in that respect, Astronomy is peculiarly adapted to remedy a little and narrow spirit. In that science there are good reasons assigned to prove the sun an hundred thousand times bigger than our earth, and the distance of the stars so prodigious, that a cannon-bullet continuing in its ordinary rapid motion, would not arrive from hence at the nearest of them in the space of an hundred and fifty thousand years. These ideas wonderfully dilate and expand the mind. There is something in the immensity of this distance that shocks and overwhelms the imagination; it is too big for the grasp of a human intellect: estates, provinces, and kingdoms vanish at its presence. It were to be wished a certain prince[19], who hath encouraged the study of it in his subjects, had been himself a proficient in astronomy. This might have shewed him how mean an ambition that was which terminated in a small part of what is itself but a point, in respect to that part of the universe which lies within our view.

But the Christian Religion ennobleth and enlargeth the mind beyond any other profession or science whatsoever. Upon that scheme, while the earth, and the transient enjoyments of this life, shrink into the narrowest dimensions, and are accounted as 'the dust of a balance, the drop of a bucket, yea, less than nothing,' the intellectual world opens wider to our view. The perfections of the Deity, the nature and excellence of virtue, the dignity of the human soul, are displayed in the largest characters. The mind of man seems to adapt itself to the different nature of its objects; it is contracted and debased by being conversant in little and low things, and feels a proportionable enlargement arising from the contemplation of these great and sublime ideas.

[19] Lewis XIV.

The greatness of things is comparative; and this does not only hold in respect of extension, but likewise in respect of dignity, duration, and all kinds of perfection. Astronomy opens the mind, and lters our j dgment, with regard to the magnitude of extended beings; but Christianity produceth an universal greatness of soul. Philosophy increaseth our views in every respect, but Christianity extends them to a degree beyond the light of nature.

How mean must the most exalted potentate upon earth appear to that eye which takes in innumerable orders of blessed spirits, differing in glory and perfection! How little must the amusements of sense, and the ordinary occupations of mortal men, seem to one who is engaged in so noble a pursuit as the assimilation of himself to the Deity, which is the proper employment of every Christian!

And the improvement which grows from habituating the mind to the comprehensive views of religion must not be thought wholly to regard the understanding. Nothing is of greater force to subdue the inordinate motions of the heart, and to regulate the will. Whether a man be actuated by his passions or his reason, these are first wrought upon by some object, which stirs the soul in proportion to its apparent dimensions. Hence irreligious men, whose short prospects are filled with earth, and sense, and mortal life, are invited, by these mean ideas, to actions proportionably little and low. But a mind whose views are enlightened and extended by religion is animated to nobler pursuits by more sublime and remote objects.

There is not any instance of weakness in the Free-thinkers that raises my indignation more than their tending to ridicule Christians as men of narrow understandings, and to pass themselves upon the world for persons of superior sense, and more enlarged views. But I leave it to any impartial man to judge which hath the nobler sentiments, which the greater views; he whose notions are stinted to a few miserable inlets of sense, or he whose sentiments are raised above the common taste by the anticipation of those delights which will satiate the soul, when the whole capacity of her nature is branched out into new faculties? He who looks for nothing beyond this short span of duration, or he whose aims are co-extended with the endless length of eternity? He who derives his spirit from the elements, or he who thinks it was inspired by the Almighty?

X.

ON SHORT-SIGHTEDNESS OF MIND[20].

——Certum voto pete finem.—Hor. *Ep.* 2. l. 1. v. 56.

——To wishes fix an end.—Creech.

The writers of morality assign two sorts of Goods. The one is in itself desirable; the other is to be desired, not on account of its own excellency, but for the sake of some other thing which it is instrumental to obtain. These are usually distinguished by the appellations of End and Means. We are prompted by nature to desire the former, but that we have any appetite for the latter is owing to choice and deliberation.

But as wise men engage in the pursuit of means from a farther view of some natural good with which they are connected; fools, who are actuated by imitation and not by reason, blindly pursue the means, without any design or prospect of applying them. The result whereof is, that they entail upon themselves the anxiety and toil, but are debarred from the subsequent delights which arise to wiser men; since their views, not reaching the end, terminate in those things which, although they have a relative goodness, yet considered absolutely are indifferent, or it may be evil.

The principle of this misconduct is a certain short-sightedness in the mind. And as this defect is branched forth into innumerable errors in life, and hath infected all ranks and conditions of men, so it more eminently appears in three species—the Critics, Misers, and Free-thinkers. I shall endeavour to make good this observation with regard to each of them. And first of the Critic.

Profit and pleasure are the ends that a reasonable creature would propose to obtain by study, or indeed by any other undertaking. Those parts of learning which relate to the imagination, as eloquence and poetry, produce an immediate pleasure in the mind. And sublime and useful truths, when they are conveyed in apt allegories or beautiful images, make more distinct and lasting impressions; by which means the fancy becomes subservient to

[20] *Guardian*, No. 77, Tuesday, June 9, 1713.

the understanding, and the mind is at the same time delighted and instructed. The exercise of the understanding in the discovery of truth is likewise attended with great pleasure, as well as immediate profit. It not only strengthens our faculties, purifies the soul, subdues the passions; but, besides these advantages, there is also a secret joy that flows from intellectual operations, proportioned to the nobleness of the faculty, and not the less affecting because inward and unseen.

But the mere exercise of the memory as such, instead of bringing pleasure or immediate benefit, is a thing of vain irksomeness and fatigue, especially when employed in the acquisition of languages, which is, of all others, the most dry and painful occupation. There must be therefore something further proposed, or a wise man would never engage in it. And, indeed, the very reason of the thing plainly intimates that the motive which first drew men to affect a knowledge in dead tongues was that they looked on them as means to convey more useful and entertaining knowledge into their minds.

There are nevertheless certain critics, who, seeing that Greek and Latin are in request, join in a thoughtless pursuit of those languages, without any further view. They look on the ancient authors, but it is with an eye to phraseology, or certain minute particulars which are valuable for no other reason but because they are despised and forgotten by the rest of mankind. The divine maxims of morality, the exact pictures of human life, the profound discoveries in the arts and sciences, just thoughts, bright images, sublime sentiments, are overlooked, while the mind is learnedly taken up in verbal remarks.

Was a critic ever known to read Plato with a contemplative mind; or Cicero, in order to imbibe the noble sentiments of virtue and a public spirit which are conspicuous in the writings of that great man; or to peruse the Greek or Roman historians, with an intention to form his own life upon the plan of the illustrious patterns they exhibit to our view? Plato wrote in Greek. Cicero's Latin is fine. And it often lies in a man's way to quote the ancient historians.

There is no entertainment upon earth more noble and befitting a reasonable mind than the perusal of good authors, or that better qualifies a man to pass his life with satisfaction to himself, or

advantage to the public. But where men of short views and mean souls give themselves to that sort of employment which nature never designed them for, they, indeed, keep one another in countenance; but, instead of cultivating and adorning their own minds, or acquiring an ability to be useful to the world, they reap no other advantage from their labours than the dry consolation arising from the applauses they bestow upon each other.

And the same weakness, or defect of the mind from whence Pedantry takes its rise does likewise give birth to Avarice. Words and money are both to be regarded as only marks of things. And as the knowledge of the one, so the possession of the other is of no use, unless directed to a further end. A mutual commerce could not be carried on among men if some common standard had not been agreed upon, to which the value of all the various products of art and nature were reducible, and which might be of the same use in the conveyance of property as words are in that of ideas. Gold, by its beauty, scarceness, and durable nature, seems designed by Providence to a purpose so excellent and advantageous to mankind. Upon these considerations that metal came first into esteem. But such who cannot see beyond what is nearest in the pursuit, beholding mankind touched with an affection for gold, and being ignorant of the true reason that introduced this odd passion into human nature, imagine some intrinsic worth in the metal to be the cause of it. Hence the same men who, had they been turned towards learning, would have employed themselves in laying up words in their memory, are, by a different application, employed to as much purpose in treasuring up gold in their coffers. They differ only in the object; the principle on which they act, and the inward frame of mind, is the same in the Critic and the Miser.

And upon a thorough observation, our modern sect of Free-thinkers will be found to labour under the same defect with those two inglorious species. Their short views are terminated in the next objects, and their specious pretences for liberty and truth are so many instances of mistaking the means for the end. But the setting these points in a clear light must be the subject of another paper.

XI.

HAPPINESS OBSTRUCTED BY FREE-THINKERS[21].

Nimirum insanus paucis videatur, eo quod
Maxima pars hominum morbo jactatur eodem.
HOR. *Sat.* 3. l. 2. v. 120.

———Few think these mad, for most, like these,
Are sick and troubled with the same disease.—CREECH.

THERE is a restless endeavour in the mind of man after Happiness. This appetite is wrought into the original frame of our nature, and exerts itself in all parts of the creation that are endued with any degree of thought or sense. But, as the human mind is dignified by a more comprehensive faculty than can be found in the inferior animals, it is natural for men not only to have an eye each to his own happiness, but also to endeavour to promote that of others in the same rank of being: and in proportion to the generosity that is ingredient in the temper of the soul, the object of its benevolence is of a larger and narrower extent. There is hardly a spirit upon earth so mean and contracted as to centre all regards on its own interest, exclusive of the rest of mankind. Even the selfish man has some share of love which he bestows on his family and his friends. A nobler mind hath at heart the common interest of the society or country of which he makes a part. And there is still a more diffusive spirit, whose being or intentions reach the whole mass of mankind, and are continued beyond the present age, to a succession of future generations.

The advantage arising to him who hath a tincture of this generosity on his soul is, that he is affected with a sublimer joy than can be comprehended by one who is destitute of that noble relish. The happiness of the rest of mankind hath a natural connection with that of a reasonable mind. And in proportion as the actions of each individual contribute to this end, he must be thought to

[21] *Guardian*, No. 83, Tuesday, June 16, 1713. This paper has been ascribed to Berkeley though it is not mentioned in the list of his papers in the *Guardian* communicated by his son.

deserve well or ill both of the world and of himself. I have in a late paper observed, that men who have no reach of thought do oft misplace their affections on the means, without respect to the end, and by a preposterous desire of things in themselves indifferent forego the enjoyment of that happiness which those things are instrumental to obtain. This observation has been considered with regard to Critics and Misers; I shall now apply it to Free-thinkers.

Liberty and truth are the main points which these gentlemen pretend to have in view; to proceed therefore methodically, I will endeavour to shew, in the first place, that liberty and truth are not in themselves desirable, but only as they relate to a farther end. And secondly, that the sort of liberty and truth (allowing them those names) which our Free-thinkers use all their industry to promote, is destructive of that end, viz. human Happiness; and consequently that species, as such, instead of being encouraged or esteemed, merit the detestation and abhorrence of all honest men. In the last place, I design to shew that, under the pretence of advancing liberty and truth, they do in reality promote the two contrary evils.

As to the first point, it has been observed that it is the duty of each particular person to aim at the Happiness of his fellow-creatures; and that as this view is of a wider or narrower extent, it argues a mind more or less virtuous. Hence it follows that a liberty of doing good actions which conduce to the felicity of mankind, and a knowledge of such truths as might either give us pleasure in the contemplation of them, or direct our conduct to the great ends of life, are valuable perfections. But shall a good man, therefore, prefer a liberty to commit murder or adultery before the wholesome restraint of divine and human laws? Or shall a wise man prefer the knowledge of a troublesome and afflicting truth before a pleasant error that would cheer his soul with joy and comfort, and be attended with no ill consequences? Surely no man of common sense would thank him who had put it in his power to execute the sudden suggestions of a fit of passion or madness, or imagine himself obliged to a person who, by forwardly informing him of ill news, had caused his soul to anticipate that sorrow which she would never have felt so long as the ungrateful truth lay concealed.

Let us then respect the Happiness of our species, and in this light examine the proceedings of the Free-thinkers. From what giants and monsters would these knight-errants undertake to free the world? From the ties that religion imposeth on our minds, from the expectation of a future judgment, and from the terrors of a troubled conscience, not by reforming men's lives, but by giving encouragement to their vices. What are those important truths of which they would convince mankind? That there is no such thing as a wise and just Providence; that the mind of man is corporeal; that religion is a state-trick, contrived to make men honest and virtuous, and to procure a subsistence to others for teaching and exhorting them to be so; that the good tidings of Life and Immortality brought to light by the Gospel are fables and impostures: from believing that we are made in the image of God, they would degrade us to an opinion that we are on a level with the beasts that perish. What pleasure or what advantage do these notions bring to mankind? Is it of any use to the public that good men should lose the comfortable prospect of a reward to their virtue, or the wicked be encouraged to persist in their impiety, from an assurance that they shall not be punished for it hereafter.

Allowing, therefore, these men to be patrons of liberty and truth, yet it is of such truths and that sort of liberty which makes them justly be looked upon as enemies to the peace and happiness of the world. But upon a thorough and impartial view it will be found that their endeavours, instead of advancing the cause of liberty and truth, tend only to introduce slavery and error among men. There are two parts in our nature, the baser, which consists of our senses and passions, and the more noble and rational, which is properly the human part, the other being common to us with brutes. The inferior part is generally much stronger, and has always the start of reason, which if, in the perpetual struggle between them, it were not aided from heaven by religion would almost universally be vanquished, and man become a slave to his passions, which as it is the most grievous and shameful slavery, so it is the genuine result of that liberty which is proposed by overturning religion. Nor is the other part of their design better executed. Look into their pretended truths; are they not so

many wretched absurdities, maintained in opposition to the light of nature and divine revelation by sly inuendos and cold jests, by such pitiful sophisms and such confused and indigested notions that one would vehemently suspect those men usurped the name of Free-thinkers with the same view that hypocrites do that of godliness, that it may serve for a cloke to cover the contrary defect?

I shall close this discourse with a parallel reflexion on these three species, who seem to be allied by a certain agreement in mediocrity of understanding. A Critic is entirely given up to the pursuit of learning; when he has got it, is his judgment clearer, his imagination livelier, or his manners more polite than those of other men? Is it observed that a Miser, when he has acquired his superfluous estate, eats, drinks, or sleeps with more satisfaction, that he has a cheerfuller mind, or relishes any of the enjoyments of life better than his neighbours? The Free-thinkers plead hard for a licence to think freely; they have it: but what use do they make of it? Are they eminent for any sublime discoveries in any of the arts and sciences? have they been authors of any inventions that conduce to the well-being of mankind? Do their writings shew a greater depth of design, a clearer method, or more just and correct reasoning than those of other men?

There is a great resemblance in their genius, but the Critic and Miser are only ridiculous and contemptible creatures, while the Free-thinker is also a pernicious one.

XII.

THE CHRISTIAN IDEAS OF GOD[22].

Mens agitat molem.....—VIRG. *Æn.* 6. v. 772.

A mind informs the mass.

To one who regards things with a philosophical eye, and hath a soul capable of being delighted with the sense that

[22] *Guardian*, No. 88, Monday, June 22, 1713. This and the following Essay are not included in Dr. George Berkeley's list of his father's papers. It is alleged that

truth and knowledge prevail among men, it must be a grateful reflection to think that the sublimest truths, which among the heathens only here and there one of brighter parts and more leisure than ordinary could attain to, are now grown familiar to the meanest inhabitants of these nations.

Whence came this surprising change, that regions formerly inhabited by ignorant and savage people should now outshine ancient Greece, and the other eastern countries, so renowned of old, in the most elevated notions of theology and morality? Is it the effect of our own parts and industry? Have our common mechanics more refined understandings than the ancient philosophers? It is owing to the God of Truth, who came down from heaven, and condescended to be himself our teacher. It is as we are Christians that we profess more excellent and divine truths than the rest of mankind.

If there be any of the Free-thinkers who are not direct atheists, charity would incline one to believe them ignorant of what is here advanced. And it is for their information that I write this paper, the design of which is to compare the ideas that Christians entertain of the being and attributes of a God, with the gross notions of the Heathen world. Is it possible for the mind of man to conceive a more august idea of the Deity than is set forth in the Holy Scriptures? I shall throw together some passages relating to this subject, which I propose only as philosophical sentiments, to be considered by a Free-thinker.

'Though there be that are called gods, yet to us there is but one God. He made the heaven, and heaven of heavens, with all their host; the earth and all things that are therein; the seas and all that is therein; He said, let them be, and it was so. He hath stretched forth the heavens. He hath founded the earth and hung it upon nothing. He hath shut up the sea with doors, and said, Hitherto shalt thou come and no farther, and here shall thy proud waves be stayed. The Lord is an invisible spirit, in whom we live, and move, and have our being. He is the fountain of life. He preserveth man and beast. He giveth food to all flesh. In His hand is the soul of every

we have Steele's authority for attributing them to Berkeley. See the second letter in *Guardian*, No. 90, which (if not to Mr. Deane Bartelett) was probably addressed to Berkeley.

living thing, and the breath of all mankind. The Lord maketh poor and maketh rich. He bringeth low and lifteth up. He killeth and maketh alive. He woundeth and He healeth. By Him kings reign, and princes decree justice, and not a sparrow falleth to the ground without Him. All angels, authorities, and powers are subject to Him. He appointeth the moon for seasons, and the sun knoweth His going down. He thundereth with His voice, and directeth it under the whole heaven, and His lightning unto the ends of the earth. Fire and hail, snow and vapour, wind and storm, fulfil His word. The Lord is King for ever and ever, and His dominion is an everlasting dominion. The earth and the heavens shall perish, but Thou, O Lord, remainest. They all shall wax old as doth a garment, and as a vesture shalt Thou fold them up, and they shall be changed; but Thou art the same, and Thy years shall have no end. God is perfect in knowledge; His understanding is infinite. He is the Father of lights. He looketh to the ends of the earth, and seeth under the whole heaven. The Lord beholdeth all the children of men from the place of His habitation, and considereth all their works. He knoweth our down-sitting and up-rising. He compasseth our path and counteth our steps. He is acquainted with all our ways; and when we enter our closet and shut our door He seeth us. He knoweth the things that come into our mind, every one of them: and no thought can be withholden from Him. The Lord is good to all, and His tender mercies are over all His works. He is a Father of the fatherless, and a judge of the widow. He is the God of peace, the Father of mercies, and the God of all comfort and consolation. The Lord is great, and we know Him not; His greatness is unsearchable. Who but He hath measured the waters in the hollow of His hand, and meted out the heavens with a span? Thine, O Lord, is the greatness, and the power, and the glory, and the victory, and the majesty. Thou art very great, Thou art clothed with honour. Heaven is Thy throne and earth is Thy footstool.'

Can the mind of a philosopher rise to a more just and magnificent, and at the same time a more amiable idea of the Deity than is here set forth in the strongest images and most emphatical language? And yet this is the language of shepherds and fishermen. The illiterate Jews and poor persecuted Christians retained these

noble sentiments, while the polite and powerful nations of the earth were given up to that sottish sort of worship of which the following elegant description is extracted from one of the inspired writers.

'Who hath formed a god, and molten an image that is profitable for nothing? The smith with the tongs both worketh in the coals and fashioneth it with hammers, and worketh it with the strength of his arms: yea he is hungry and his strength faileth. He drinketh no water and is faint. A man planteth an ash, and the rain doth nourish it. He burneth part thereof in the fire. He roasteth roast. He warmeth himself. And the residue thereof he maketh a god. He falleth down unto it, and worshippeth it, and prayeth unto it, and saith, Deliver me, for thou art my god. None considereth in his heart, I have burnt part of it in the fire, yea also, I have baked bread upon the coals thereof: I have roasted flesh and eaten it; and shall I make the residue thereof an abomination? Shall I fall down to the stock of a tree?'

In such circumstances as these, for a man to declare for free-thinking, and disengage himself from the yoke of idolatry, were doing honour to human nature, and a work well becoming the great asserters of reason. But in a church, where our adoration is directed to the supreme Being, and (to say the least) where is nothing either in the object or manner of worship that contradicts the light of nature; there, under the pretence of free-thinking, to rail at the religious institutions of their country, sheweth an undistinguishing genius that mistakes opposition for freedom of thought. And, indeed, notwithstanding the pretences of some few among our Free-thinkers, I can hardly think there are men so stupid and inconsistent with themselves, as to have a serious regard for Natural Religion, and at the same time use their utmost endeavours to destroy the credit of those sacred Writings, which as they have been the means of bringing these parts of the world to the knowledge of natural religion, so in case they lose their authority over the minds of men, we should of course sink into the same idolatry which we see practised by other unenlightened nations.

If a person who exerts himself in the modern way of free-thinking be not a stupid idolater, it is undeniable that he con-

tributes all he can to the making other men so, either by ignorance or design; which lays him under the dilemma, I will not say of being a fool or knave, but of incurring the contempt or detestation of mankind.

XIII.

CHRISTIAN IDEAS OF A FUTURE STATE[23].

> Igneus est ollis vigor, et cœlestis origo
> Seminibus——— VIRG. *Æn.* 6. v. 730.
>
> They boast ethereal vigour, and are form'd
> From seeds of heavenly birth.

THE same faculty of reason and understanding, which placeth us above the brute part of the creation, doth also subject our minds to greater and more manifold disquiets than creatures of an inferior rank are sensible of. It is by this that we anticipate future disasters, and oft create to ourselves real pain from imaginary evils, as well as multiply the pangs arising from those which cannot be avoided.

It behoves us therefore to make the best use of that sublime talent, which, so long as it continues the instrument of passion, will serve only to make us more miserable, in proportion as we are more excellent than other beings.

It is the privilege of a thinking being to withdraw from the objects that solicit his senses, and turn his thoughts inward on himself. For my own part I often mitigate the pain arising from the little misfortunes and disappointments that checker human life by this introversion of my faculties, wherein I regard my own soul as the image of her Creator, and receive great consolation from beholding those perfections which testify her divine original, and lead me into some knowledge of her everlasting archetype.

But there is not any property or circumstance of my being that I contemplate with more joy than my Immortality. I can easily overlook any present momentary sorrow, when I reflect

[23] *Guardian*, No. 89, Tuesday, June 23, 1713.

that it is in my power to be happy a thousand years hence. If it were not for this thought, I had rather be an oyster than a man, the most stupid and senseless of animals than a reasonable mind tortured with an extreme innate desire of that perfection which it despairs to obtain.

It is with great pleasure that I behold instinct, reason, and faith concurring to attest this comfortable truth. It is revealed from heaven, it is discovered by philosophers, and the ignorant, unenlightened part of mankind have a natural propensity to believe it. It is an agreeable entertainment to reflect on the various shapes under which this doctrine has appeared in the world. The Pythagorean transmigration, the sensual habitations of the Mahometan, and the shady realms of Pluto, do all agree in the main points, the continuation of our existence, and the distribution of rewards and punishments, proportioned to the merits or demerits of men in this life.

But in all these schemes there is something gross and improbable, that shocks a reasonable and speculative mind. Whereas nothing can be more rational and sublime than the christian idea of a Future State. 'Eye hath not seen, nor ear heard, neither hath it entered into the heart of man to conceive the things which God hath prepared for those that love him.' The abovementioned schemes are narrow transcripts of our present state: but in this indefinite description there is something ineffably great and noble. The mind of man must be raised to a higher pitch, not only to partake the enjoyments of the christian Paradise, but even to be able to frame any notion of them.

Nevertheless, in order to gratify our imagination, and by way of condescension to our low way of thinking, the ideas of light, glory, a crown &c. are made use of to adumbrate that which we cannot directly understand. 'The Lamb which is in the midst of the throne shall feed them, and shall lead them unto living fountains of waters; and God shall wipe away all tears from their eyes. And there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain; for the former things are passed away, and behold all things are new. There shall be no night there, and they need no candle, neither light of the sun: for the Lord God giveth them light, and shall make them drink of the river of his pleasures; and they shall reign

for ever and ever. They shall receive a crown of glory which fadeth not away.'

These are cheering reflections; and I have often wondered that men could be found so dull and phlegmatic as to prefer the thought of annihilation before them; or so ill-natured as to endeavour to persuade mankind to the disbelief of what is so pleasing and profitable even in the prospect; or so blind as not to see that there is a Deity, and if there be, that this scheme of things flows from his attributes, and evidently corresponds with the other parts of his creation.

I know not how to account for this absurd turn of thought, except it proceed from a want of other employment joined with an affectation of singularity. I shall, therefore, inform our modern Free-thinkers of two points whereof they seem to be ignorant. The first is, that it is not the being singular, but being singular for something, that argues either extraordinary endowments of nature, or benevolent intentions to mankind, which draws the admiration and esteem of the world. A mistake in this point naturally arises from that confusion of thought which I do not remember to have seen so great instances of in any writers as in certain modern Free-thinkers.

The other point is, that there are innumerable objects within the reach of a human mind, and each of these objects may be viewed in innumerable lights and positions, and the relations arising between them are innumerable. There is, therefore, an infinity of things whereon to employ their thoughts, if not with advantage to the world, at least with amusement to themselves, and without offence or prejudice to other people. If they proceed to exert their talent of free-thinking in this way, they may be innocently dull, and no one take any notice of it. But to see men without either wit or argument pretend to run down divine and human laws, and treat their fellow-subjects with contempt for professing a belief of those points on which the present as well as future interest of mankind depends, is not to be endured. For my own part, I shall omit no endeavours to render their persons as despicable, and their practices as odious, in the eye of the world, as they deserve.

XIV.

MORAL ATTRACTION[21].

Homo sum, humani nihil à me alienum puto.
TER. *Heaut.* Act. 1. Sc. 1.

I am a man, and have a fellow-feeling of every thing belonging to man.

IF we consider the whole scope of the creation that lies within our view, the moral and intellectual, as well as the natural and corporeal, we shall perceive throughout a certain correspondence of the parts, a similitude of operation and unity of design, which plainly demonstrate the universe to be the work of one infinitely good and wise Being; and that the system of thinking beings is actuated by laws derived from the same divine power which ordained those by which the corporeal system is upheld.

From the contemplation of the order, motion, and cohesion of natural bodies, philosophers are now agreed that there is a mutual attraction between the most distant parts at least of this solar system. All those bodies that revolve round the sun are drawn towards each other, and towards the sun, by some secret, uniform and never-ceasing principle. Hence it is that the earth (as well as the other planets) without flying off in a tangent line, constantly rolls about the sun, and the moon about the earth, without deserting her companion in so many thousand years. And as the larger systems of the universe are held together by this cause, so likewise the particular globes derive their cohesion and consistence from it.

Now, if we carry our thoughts from the corporeal to the moral world, we may observe in the Spirits or Minds of men a like principle of attraction, whereby they are drawn together in communities, clubs, families, friendships, and all the various species of society. As in bodies, where the quantity is the same, the attraction is strongest between those which are placed nearest to each other, so it is likewise in the minds of men, *cæteris paribus*, between those which are most nearly related. Bodies that are placed at the distance of many millions of miles may nevertheless attract

[21] *Guardian*, No. 126, Wednesday, August 5, 1713.

and constantly operate on each other, although this action do not shew itself by an union or approach of those distant bodies, so long as they are withheld by the contrary forces of other bodies, which, at the same time, attract them different ways, but would, on the supposed removal of all other bodies, mutually approach and unite with each other. The like holds with regard to the human soul, whose affection towards the individuals of the same species who are distantly related to it is rendered inconspicuous by its more powerful attraction towards those who have a nearer relation to it. But as those are removed the tendency which before lay concealed doth gradually disclose itself.

A man who has no family is more strongly attracted towards his friends and neighbours; and, if absent from these, he naturally falls into an acquaintance with those of his own city or country who chance to be in the same place. Two Englishmen meeting at Rome or Constantinople soon run into a familiarity. And in China or Japan Europeans would think their being so a good reason for their uniting in particular converse. Farther, in case we suppose ourselves translated into Jupiter or Saturn, and there to meet a Chinese or other more distant native of our own planet, we should look on him as a near relation, and readily commence a friendship with him. These are natural reflections, and such as may convince us that we are linked by an imperceptible chain to every individual of the human race.

The several great bodies which compose the solar system are kept from joining together at the common centre of gravity by the rectilinear motions the Author of nature has impressed on each of them; which, concurring with the attractive principle, form their respective orbits round the sun: upon the ceasing of which motions, the general law of gravitation that is now thwarted would shew itself by drawing them all into one mass. After the same manner, in the parallel case of society, private passions and motions of the soul do often obstruct the operation of that benevolent uniting instinct implanted in human nature; which, notwithstanding, doth still exert, and will not fail to shew itself when those obstructions are taken away.

The mutual gravitation of bodies cannot be explained any other way than by resolving it into the immediate operation of God, who never ceases to dispose and actuate his creatures in a manner

suitable to their respective beings. So neither can that reciprocal attraction in the minds of men be accounted for by any other cause. It is not the result of education, law, or fashion; but is a principle originally ingrafted in the very first formation of the soul by the Author of our nature.

And as the attractive power in bodies is the most universal principle which produceth innumerable effects, and is a key to explain the various phenomena of nature; so the corresponding social appetite in human souls is the great spring and source of moral actions. This it is that inclines each individual to an intercourse with his species, and models every one to that behaviour which best suits with the common well-being. Hence that sympathy in our nature whereby we feel the pains and joys of our fellow-creatures. Hence that prevalent love in parents towards their children, which is neither founded on the merit of the object, nor yet on self-interest. It is this that makes us inquisitive concerning the affairs of distant nations which can have no influence on our own. It is this that extends our care to future generations, and excites us to acts of beneficence towards those who are not yet in being, and consequently from whom we can expect no recompence. In a word, hence arises that diffusive sense of Humanity so unaccountable to the selfish man who is untouched with it, and is, indeed, a sort of monster or anomalous production.

These thoughts do naturally suggest the following particulars. First, That as social inclinations are absolutely necessary to the well-being of the world, it is the duty and interest of each individual to cherish and improve them to the benefit of mankind; the duty, because it is agreeable to the intention of the Author of our being, who aims at the common good of his creatures, and as an indication of his will, hath implanted the seeds of mutual benevolence in our souls; the interest, because the good of the whole is inseparable from that of the parts; in promoting therefore the common good, every one doth at the same time promote his own private interest. Another observation I shall draw from the premises is, That it makes a signal proof of the divinity of the christian religion, that the main duty which it inculcates above all others is charity. Different maxims and precepts have distinguished the different sects of philosophy and religion: our Lord's peculiar precept is, 'Love thy neighbour as thyself. By this

shall all men know that you are my disciples, if you love one another.'

I will not say that what is a most shining proof of our religion is not often a reproach to its professors; but this I think very plain, that, whether we regard the analogy of nature, as it appears in the mutual attraction or gravitations of the mundane system, in the general frame and constitution of the human soul, or lastly, in the ends and aptnesses which are discoverable in all parts of the visible and intellectual world, we shall not doubt but the precept which is the characteristic of our religion came from the Author of nature. Some of our modern Free-thinkers would indeed insinuate the christian morals to be defective, because (say they) there is no mention made in the gospel of the virtue of friendship[25]. These sagacious men (if I may be allowed the use of that vulgar saying) 'cannot see the wood for trees.' That a religion whereof the main drift is to inspire its professors with the most noble and disinterested spirit of love, charity, and beneficence to all mankind, or, in other words, with a friendship to every individual man, should be taxed with the want of that very virtue, is surely a glaring evidence of the blindness and prejudice of its adversaries.

[25] See Shaftesbury's *Essay on the Freedom of Wit and Humour*, Pt. II. sect. 3.

AN ESSAY

TOWARDS

PREVENTING THE RUIN OF GREAT BRITAIN.

Avaritia fidem, probitatem, cæterasque artes bonas subvertit: pro his superbiam, crudelitatem, Deos negligere, omnia venalia habere, edocuit.—SALLUST.

Ii qui largitionem magistratus adepti sunt, dederunt operam ut ita potestatem gererent, ut illam lacunam rei familiaris explerent.—CICERO.

Omnes aut de honoribus suis, aut de præmiis pecuniæ, aut de persequendis inimicis agebant.—CÆSAR.

1721.

AN ESSAY, &c.[1]

WHETHER the prosperity that preceded, or the calamities that succeed the South Sea project have most contributed to our undoing is not so clear a point as it is that we are actually undone, and lost to all sense of our true interest. Nothing less than this could render it pardonable to have recourse to those old-fashioned trite maxims concerning Religion, Industry, Frugality, and Public Spirit, which are now forgotten, but, if revived and put in practice, may not only prevent our final ruin, but also render us a more happy and flourishing people than ever.

Religion hath in former days been cherished and reverenced by wise patriots and lawgivers, as knowing it to be impossible that a nation should thrive and flourish without virtue, or that virtue should subsist without conscience, or conscience without religion: insomuch that an atheist or infidel was looked on with abhorrence, and treated as an enemy to his country. But, in these wiser times, a cold indifference for the national religion, and indeed for all matters of faith and Divine worship, is thought good sense. It is even become fashionable to decry religion[2]; and that little talent of ridicule is applied to such wrong purposes that a good Christian can hardly keep himself in countenance.

Liberty is the greatest human blessing that a virtuous man can possess, and is very consistent with the duties of a good subject

[1] This *Essay* was first published anonymously by Berkeley in 1721, in London, soon after his return from Italy, and amidst the social prostration which followed the failure of the South Sea Scheme, in September, 1720. It was reproduced in his *Miscellany*, in 1752. The reader may compare it with its author's later tracts on the social problems of his time—the *Querist*, *Discourse to Magistrates*, *Word to the Wise*, and *Maxims*—in which, with characteristic fervour, he proclaims the simple, if utopian lesson, that social weal is secured by the virtue, especially honest industry, of the individuals who compose society.

The grossness and extravagance which marked the reigns of George I and II, as compared with the superior refinement and wit of the preceding reign, have been often remarked, as well as the loss of grace and simplicity. This struck Berkeley with dismay, on his return from the Continent after an absence of several years.

[2] So Butler, in the Introduction to his *Analogy*, fifteen years afterwards.

and a good Christian. But the present age aboundeth with injudicious patrons of liberty, who, not distinguishing between that and licentiousness, take the surest method to discredit what they would seem to propagate. For, in effect, can there be a greater affront offered to that just freedom of thought and action which is the prerogative of a rational creature, or can any thing recommend it less to honest minds, than under colour thereof to obtrude scurrility and profaneness on the world? But it hath been always observed of weak men, that they know not how to avoid one extreme without running into another.

Too many of this sort pass upon vulgar readers for great authors, and men of profound thought; not on account of any superiority either in sense or style, both which they possess in a very moderate degree, nor of any discoveries they have made in arts and sciences, which they seem to be little acquainted with; but purely because they flatter the passions of corrupt men, who are pleased to have the clamours of conscience silenced, and those great points of the Christian religion made suspected which withheld them from many vices of pleasure and interest, or made them uneasy in the commission of them.

In order to promote that laudable design of effacing all sense of religion from among us, they form themselves into assemblies, and proceed with united counsels and endeavours; with what success, and with what merit towards the public, the effect too plainly shews. I will not say these gentlemen have formed a direct design to ruin their country, or that they have the sense to see half the ill consequences which must necessarily flow from the spreading of their opinions; but the nation feels them, and it is high time the legislature put a stop to them.

I am not for placing an invidious power in the hands of the clergy, or complying with the narrowness of any mistaken zealots who should incline to persecute Dissenters. But, whatever conduct common sense, as well as Christian charity, obligeth us to use towards those who differ from us in some points of religion, yet the public safety requireth that the avowed contemners of all religion should be severely chastised. And perhaps it may be no easy matter to assign a good reason why blasphemy against God should not be inquired into and punished with the same rigour as treason against the king.

For, though we may attempt to patch up our affairs, yet it will be to no purpose; the finger of God will unravel all our vain projects, and make them snares to draw us into greater calamities, if we do not reform that scandalous libertinism which (whatever some shallow men may think) is our worst symptom, and the surest prognostic of our ruin.

Industry is the natural sure way to wealth. This is so true that it is impossible an industrious free people should want the necessaries and comforts of life, or an idle enjoy them under any form of government[3]. Money is so far useful to the public as it promoteth industry, and credit having the same effect is of the same value with money; but money or credit circulating through a nation from hand to hand, without producing labour and industry in the inhabitants, is direct gaming[3].

It is not impossible for cunning men to make such plausible schemes as may draw those who are less skilful into their own and the public ruin: But surely there is no man of sense and honesty but must see and own, whether he understands the game or not, that it is an evident folly for any people, instead of prosecuting the old honest methods of industry and frugality, to sit down to a public gaming-table, and play off their money one to another.

The more methods there are in a state for acquiring riches without industry or merit, the less there will be of either in that state; this is as evident as the ruin that attends it. Besides, when money is shifted from hand to hand in such a blind, fortuitous manner that some men shall from nothing in an instant acquire vast estates without the least desert; while others are as suddenly stripped of plentiful fortunes, and left on the parish by their own avarice and credulity, what can be hoped for, on the one hand, but abandoned luxury and wantonness, or, on the other, but extreme madness and despair?

In short, all projects for growing rich by sudden and extraordinary methods, as they operate violently on the passions of men, and encourage them to despise the slow moderate gains that are to be made by an honest industry, must be ruinous to the public, and even the winners themselves will at length be involved in the public ruin.

[3] Cf. *Querist*, Qu. 1—47, 217—254, &c.

It is an easy matter to contrive projects for the encouragement of industry: I wish it were as easy to persuade men to put them in practice. There is no country in Europe where there is so much charity collected for the poor, and none where it is so ill managed. If the poor-tax fixed was fixed at a medium in every parish, taken from a calculation of the last ten years, and raised for seven years by act of parliament, that sum (if the common estimate be not very wrong), frugally and prudently laid out in workhouses, would for ever free the nation from the care of providing for the poor, and at the same time considerably improve our manufactures. We might by these means rid our streets of beggars; even the children, the maimed, and the blind, might be put in a way of doing something for their livelihood. As for the small number of those who by age or infirmities are utterly incapable of all employment, they might be maintained by the labour of others; and the public would receive no small advantage from the industry of those who are now so great a burden and expense to it[4].

The same tax, continued three years longer, might be very usefully employed in making high roads, and rendering rivers navigable—two things of so much profit and ornament to a nation, that we seem the only people in Europe who have neglected them[5]. So that in the space of ten years the public may be for ever freed from a heavy tax, industry encouraged, commerce facilitated, and the whole country improved, and all this only by a frugal honest management, without raising one penny extraordinary.

The number of people is both means and motives to industry[6]. It should therefore be of great use to encourage propagation, by allowing some reward or privilege to those who have a certain number of children; and, on the other hand, enacting that the public shall inherit half the unentailed estates of all who die unmarried of either sex.

Besides the immediate end proposed by the foregoing methods, they furnish taxes upon passengers, and dead bachelors, which are in no sort grievous to the subject, and may be applied towards clearing the public debt, which, all mankind agree, highly concern-

[4] We have here a characteristic recognition of abuses apt to accompany poor-rates, and suggestions of means for correcting them. Cf. *Querist*, Qu. 375—381.

[5] [This was published before turnpikes were erected.]—Author.

[6] Cf. *Querist*, Qu. 62, 87, 130, 206, 217, 372.

eth the nation in general, both court and country. Cæsar[7] indeed mentions it as a piece of policy that he borrowed money from his officers to bestow it on the soldiers, which fixed both to his interest; and, though something like this may pass for skill at certain junctures in civil government, yet, if carried too far, it will prove a dangerous experiment.

There is still room for invention or improvement in most trades and manufactures, and it is probable, that premiums given on that account to ingenious artists, would soon be repaid a hundred-fold to the public. No colour is so much wore in Italy, Spain, and Portugal, as black; but our black cloth is neither so lasting, nor of so good a dye as the Dutch, which is the reason of their engrossing the profit of that trade. This is so true that I have known English merchants abroad wear black cloth of Holland themselves, and sell and recommend it as better than that of their own country. It is commonly said the water of Leyden hath a peculiar property for colouring black, but it hath been also said and passed current that good glasses may be made no where but at Venice, and there only in the island of Murano; which was attributed to some peculiar property in the air. And we may possibly find other opinions of that sort to be as groundless, should the legislature think it worth while to propose premiums in the foregoing, or in the like cases of general benefit to the public; but I remember to have seen, about seven years ago, a man pointed at in a coffee-house who (they said) had first introduced the right scarlet dye among us, by which the nation in general, as well as many private persons, have since been great gainers, though he was himself a beggar, who, if this be true, deserved an honourable maintenance from the public.

There are also several manufactures which we have from abroad that may be carried on to as great perfection here as elsewhere. If it be considered that more fine linen[8] is wore in Great Britain than in any other country of Europe, it will be difficult to assign a reason why paper[8] may not be made here as good, and in the same quantity, as in Holland, or France, or Genoa. This is a manufacture of great consumption, and would save much to the public. The like may be said of tapestry, lace, and other manufactures,

[7] *De Bello Civili*, I. 39.

[8] Cf. *Querist*, Qu. 74, 82, 83.

which, if set on foot in cheap parts of the country, would employ many hands, and save money to the nation, as well as bring it from abroad[9]. Projects for improving old manufactures, or setting up new ones, should not be despised in a trading country, but the making them pretences for stock-jobbing hath been a fatal imposition.

As industry dependeth upon trade, and this, as well as the public security, upon our navigation, it concerneth the legislature to provide that the number of our sailors do not decrease—to which it would very much conduce, if a law were made prohibiting the payment of sailors in foreign parts; for it is usual with those on board merchant-men as soon as they set foot on shore to receive their pay, which is soon spent in riotous living; and when they have emptied their pockets, the temptation of a pistole present money never faileth to draw them into any foreign service. To this (if I may credit the information I have had from some English factors abroad) it is chiefly owing, that the Venetians, Spaniards, and others have so many English on board their ships. Some merchants indeed and masters of vessels may make a profit in defrauding those poor wretches, when they pay them in strange coin (which I have been assured often amounts to twelvepence in the crown), as well as in ridding themselves of the charge of keeping them when they sell their ships, or stay long in port; but the public lose both the money and the men, who, if their arrears were to be cleared at home, would be sure to return, and spend them in their own country. It is a shame this abuse should not be remedied.

Frugality of manners is the nourishment and strength of bodies politic. It is that by which they grow and subsist, until they are corrupted by luxury; the natural cause of their decay and ruin. Of this we have examples in the Persians, Lacedemonians, and Romans: not to mention many later governments which have sprung up, continued awhile, and then perished by the same natural causes. But these are, it seems, of no use to us; and, in spite of them, we are in a fair way of becoming ourselves another useless example to future ages.

Men are apt to measure national prosperity by riches. It would be righter to measure it by the use that is made of them. Where

[9] Cf. *Querist*, Qu. 64—69, 144.

they promote an honest commerce among men, and are motives to industry and virtue, they are, without doubt, of great advantage; but where they are made (as too often happens) an instrument to luxury, they enervate and dispirit the bravest people. So just is that remark of Machiavel—that there is no truth in the common saying, money is the nerves of war; and though we may subsist tolerably for a time amongst corrupt neighbours, yet if ever we have to do with a hardy, temperate, religious sort of men, we shall find, to our cost, that all our riches are but a poor exchange for that simplicity of manners which we despise in our ancestors. This sole advantage hath been the main support of all the republics that have made a figure in the world; and perhaps it might be no ill policy in a kingdom to form itself upon the manners of a republic.

Simplicity of manners may be more easily preserved in a republic than a monarchy; but if once lost may be sooner recovered in a monarchy, the example of a court being of great efficacy, either to reform or to corrupt a people; that alone were sufficient to discountenance the wearing of gold or silver, either in clothes or equipage, and if the same were prohibited by law, the saving so much bullion would be the smallest benefit of such an institution —there being nothing more apt to debase the virtue and good sense of our gentry of both sexes than the trifling vanity of apparel which we have learned from France, and which hath had such visible ill consequences on the genius of that people. Wiser nations have made it their care to shut out this folly by severe laws and penalties, and its spreading among us can forebode no good, if there be any truth in the observation of one of the ancients, that the direct way to ruin a man is to dress him up in fine clothes.

It cannot be denied that luxury of Dress[10] giveth a light behaviour to our women, which may pass for a small offence, because it is a common one, but is in truth the source of great corruptions. For this very offence the prophet Isaiah denounced a severe judgment against the ladies of his time. I shall give the passage[11] at length: 'Moreover, the Lord saith, Because the daughters of Zion are haughty, and walk with stretched forth necks and wanton eyes, walking and mincing as they go, and making a tinkling with their feet; therefore the Lord will smite with a scab the crown of the

[10] Cf. *Querist*, Qu. 102, 103, 141, 144—149, 422, 452—457.
[11] Isaiah iii. 16-24.

head of the daughters of Zion, and the Lord will discover their secret parts. In that day the Lord will take away the bravery of their tinkling ornaments about their feet, and their cauls, and their round tires like the moon, the chains, and the bracelets, and the mufflers, the bonnets, and the ornaments of the legs, and the headbands, and the tablets, and the ear-rings, the rings and nose-jewels, the changeable suits of apparel, and the mantles, and the wimples, and the crisping-pins, the glasses, and the fine linen, and the hoods and the vails. And it shall come to pass that instead of a sweet smell there shall be stink; and instead of a girdle a rent; and instead of well-set hair, baldness, and instead of a stomacher, a girding of sackcloth; and burning instead of beauty.' The scab, the stench, and the burning are terrible pestilential symptoms, and our ladies would do well to consider they may chance to resemble those of Zion in their punishment as well as their offence.

But dress is not the only thing to be reformed, sumptuary laws are useful in many other points. In former times the natural plainness and good sense of the English made them less necessary. But ever since the luxurious reign of King Charles the Second we have been doing violence to our natures, and are by this time so much altered for the worse that it is to be feared the very same dispositions that make them necessary will for ever hinder them from being enacted or put in execution.

A private family in difficult circumstances, all men agree, ought to melt down their plate, walk on foot, retrench the number of their servants, wear neither jewels nor rich clothes, and deny themselves expensive diversions; and why not the public? Had anything like this been done, our taxes had been less, or, which is the same thing, we should have felt them less. But it is very remarkable that luxury was never at so great a height, nor spread so generally through the nation, as during the expense of the late wars, and the heavy debt that still lieth upon us.

This vice draweth after it a train of evils which cruelly infest the public; faction, ambition, envy, avarice, and that of the worst kind, being much more hurtful in its consequences, though not so infamous as penury. It was the great art of Cardinal Richelieu, by encouraging luxury and expense, to impoverish the French nobility and render them altogether dependent on the crown,

which hath been since very successfully effected. These and many more considerations shew the necessity there is for sumptuary laws; nor can anything be said against them in this island which might not with equal force be objected in other countries, which have nevertheless judged the public benefit of such institutions to be of far greater importance than the short sufferings of a few who subsist by the luxury of others.

It is evident that old taxes may be better borne, as well as new ones raised, by sumptuary laws judiciously framed, not to damage our trade, but retrench our luxury. It is evident that, for want of these, luxury (which, like the other fashions, never faileth to descend) hath infected all ranks of people, and that this enableth the Dutch and French to undersell us, to the great prejudice of our traffic. We cannot but know that, in our present circumstances, it should be our care, as it is our interest, to make poverty tolerable; in short, we have the experience of many ages to convince us that a corrupt luxurious people must of themselves fall into slavery, although no attempt be made upon them. These and the like obvious reflections should, one would think, have forced any people in their senses upon frugal measures.

But we are doomed to be undone. Neither the plain reason of the thing, nor the experience of past ages, nor the examples we have before our eyes, can restrain us from imitating, not to say surpassing, the most corrupt and ruined people, in those very points of luxury that ruined them. Our Gaming, our Operas, our Masquerades, are, in spite of our debts and poverty, become the wonder of our neighbours. If there be any man so void of all thought and common sense as not to see where this must end, let him but compare what Venice was at the league of Cambray with what it is at present, and he will be convinced how truly those fashionable pastimes are calculated to depress and ruin a nation.

But neither Venice nor Paris, nor any other town in any part of the world, ever knew such an expensive ruinous folly as our Masquerade[12]. This alone is sufficient to inflame and satisfy the

[12] The abuses of the Masquerade (occasionally checked) were the scandal of fashionable life during last century in England. About 1721, they were attacked in the newspapers, and in satirical as well as serious pamphlets. On a remonstrance by the Bishop of London, this favourite amusement of the town was afterwards the subject of a royal proclamation. See Wright's *England under the House of Hanover*, chaps. 3, 14.

several appetites for gaming, dressing, intriguing, and luxurious eating and drinking. It is a most skilful abridgment, the very quintessence, the abstract of all those senseless vanities that have ever been the ruin of fools and detestation of wise men. And all this, under the notion of an elegant entertainment, hath been admitted among us; though it be in truth a contagion of the worst kind. The plague, dreadful as it is, is an evil of short duration; cities have often recovered and flourished after it; but when was it known that a people broken and corrupt by luxury recovered themselves? Not to say that general corruption of manners never faileth to draw after it some heavy judgment of war, famine, or pestilence. Of this we have a fresh instance in one of the most debauched towns of Europe[13], and nobody knows how soon it may be our own case. This elegant entertainment is indeed suspended for the present, but there remains so strong a propension towards it that, if the wisdom of the legislature does not interpose, it will soon return, with the additional temptation of having been forbid for a time. It were stupid and barbarous to declaim against keeping up the spirit of the people by proper diversions, but then they should be proper, such as polish and improve their minds, or increase the strength and activity of their bodies; none of which ends are answered by the Masquerade, no more than by those French and Italian follies, which to our shame, are imported and encouraged at a time when the nation ought to be too grave for such trifles.

It is not to be believed what influence public diversions have on the spirit and manners of a people. The Greeks wisely saw this, and made a very serious affair of their public sports. For the same reason it will perhaps seem worthy the care of our legislature to regulate the public diversions by an absolute prohibition of those which have a direct tendency to corrupt our morals, as well as by a reformation of the Drama;—which, when rightly managed, is such a noble entertainment, and gave those fine lessons of morality and good sense to the Athenians of old, and to our British gentry above a century ago; but for these last ninety years hath entertained us, for the most part, with such wretched things as spoil instead of improving the taste and manners of the audience.

[13] [Marseilles.]—Author. In 1720 the plague broke out in Marseilles, and is said to have carried off 60,000 of the inhabitants.

Those who are attentive to such propositions only as may fill their pockets will probably slight these things as trifles below the care of the legislature. But I am sure all honest thinking men must lament to see their country run headlong into all those luxurious follies, which, it is evident, have been fatal to other nations, and will undoubtedly prove fatal to us also, if a timely stop be not put to them.

Public spirit, that glorious principle of all that is great and good, is so far from being cherished or encouraged that it is become ridiculous in this enlightened age, which is taught to laugh at every thing that is serious as well as sacred. The same atheistical narrow spirit, centering all our cares upon private interest, and contracting all our hopes within the enjoyment of this present life, equally produceth a neglect of what we owe to God and our country. Tully[14] hath long since observed 'that it is impossible for those who have no belief of the immortality of the soul, or a future state of rewards and punishments, to sacrifice their particular interests and passions to the public good, or have a generous concern for posterity,' and our own experience confirmeth the truth of this observation.

In order therefore to recover a sense of public spirit, it is to be wished that men were first affected with a true sense of religion; *pro aris et focis*, having ever been the great motive to courage and perseverance in a public cause.

It would likewise be a very useful policy, and warranted by the example of the wisest governments, to make the natural love of fame and reputation subservient to promoting that noble principle. Triumphal arches, columns, statues, inscriptions, and the like monuments of public services, have, in former times, been found great incentives to virtue and magnanimity; and would probably have the same effects on Englishmen which they have had on Greeks and Romans. And perhaps a pillar of infamy would be found a proper and exemplary punishment in cases of signal public villainy, where the loss of fortune, liberty, or life, are not propor-

[14] Among the passages in which Cicero refers to a future life, the Editor has not found one which exactly corresponds with the version given here. The opinions of Cicero regarding the immortality of the human soul were discussed by various writers in Berkeley's time, e.g. Collins, *Discourse of Free-thinking*, pp. 135–140, &c. Cf. motto prefixed to *Alciphron*.

tioned to the crime; or where the skill of the offender, or the nature of his offence, may screen him from the letter of the law.

Several of these are to be seen at Genoa, Milan, and other towns of Italy, where it is the custom to demolish the house of a citizen who hath conspired the ruin of his country, or been guilty of any enormous crime towards the public, and in place thereof to erect a monument of the crime and criminal, described in the blackest manner. We have nothing of this sort that I know, but that which is commonly called the Monument[15], which in the last age was erected for an affair no way more atrocious than the modern unexampled attempt of men easy in their fortunes, and unprovoked by hardships of any sort, in cool blood, and with open eyes, to ruin their native country. This fact will never be forgotten, and it were to be wished that with it the public detestation thereof may be transmitted to posterity, which would in some measure vindicate the honour of the present, and be a useful lesson to future ages.

Those noble arts of architecture, sculpture, and painting do not only adorn the public but have also an influence on the minds and manners of men, filling them with great ideas, and spiriting them up to an emulation of worthy actions. For this cause they were cultivated and encouraged by the Greek cities, who vied with each other in building and adorning their temples, theatres, porticos, and the like public works, at the same time that they discouraged private luxury; the very reverse of our conduct.

To propose the building a parliament house, courts of justice, royal palace, and other public edifices, suitable to the dignity of the nation, and adorning them with paintings and statues, which may transmit memorable things and persons to posterity, would probably be laughed at as a vain affair, of great expense, and little use to the public; and it must be owned we have reduced ourselves to such straits that any proposition of expense suiteth ill with our present circumstances. But, how proper soever this proposal may be for the times, yet it comes so properly into a discourse of public spirit that I could not but say something of it. And at another time it will not seem unreasonable, if we consider

[15] [The South-sea project.]—Author. The allusion is to the 'Monument' erected (1671–1677) to commemorate the Great Fire of London. The Fire was attributed to a Popish plot, in an inscription added in 1681, and erased in 1831.

that it is no more than the wisest nations have done before us, that it would spirit up new arts, employ many hands, keep the money circulating at home, and, lastly, that it would be a notable instance of public spirit, as well as a motive to it[16].

The same noble principle may be also encouraged by erecting an Academy of ingenious men, whose employment it would be to compile the history of Great Britain, to make discourses proper to inspire men with a zeal for the public, and celebrate the memory of those who have been ornaments to the nation, or done it eminent service. Not to mention that this would improve our language, and amuse some busy spirits of the age; which perhaps would be no ill policy.

This is not without example; for, to say nothing of the French Academy, which is prostituted to meaner purposes, it hath been the custom of the Venetian Senate to appoint one of their order to continue the history of the Republic. This was introduced in the flourishing state of that people, and is still in force. We fall short of other nations in the number of good historians, though no nation in Christendom hath produced greater events, or more worthy to be recorded. The Athenian Senate appointed orators to commemorate annually those who died in defence of their country, which solemnity was performed at their monuments erected in honour of them by the public; and the panegyrics, composed by Isocrates and Pericles, as well as many passages in Tully, inform us with what pleasure the ancient orators used to expatiate in praise of their country.

Concord and union among ourselves is rather to be hoped for as an effect of public spirit than proposed as a means to promote it. Candid, generous men, who are true lovers of their country, can never be enemies to one half of their countrymen, or carry their resentments so far as to ruin the public for the sake of a party. Now I have fallen upon the mention of our parties, I shall beg leave to insert a remark or two, for the service both of Whig and Tory, without entering into their respective merits. First, it is impossible for either party to ruin the other without involving themselves and their posterity in the same ruin. Secondly, it is very feasible for either party to get the better of the other if they could first get the better of themselves; and, instead of indulging

[16] Cf. *Querist*, Qu. 70—73, 115, 120, 398—409.

the little womanish passions of obstinacy, resentment, and revenge, steadily promote the true interest of their country, in those great clear points of piety, industry, sobriety of manners, and an honest regard for posterity, which, all men of sense agree, are essential to public happiness. There would be something so great and good in this conduct as must necessarily overbear all calumny and opposition. But that men should act reasonably is rather to be wished than hoped.

I am well aware, that to talk of public spirit, and the means of retrieving it, must, to narrow sordid minds, be matter of jest and ridicule, how conformable soever it be to right reason, and the maxims of antiquity. Though one would think the most selfish men might see it was their interest to encourage a spirit in others, by which they, to be sure, must be gainers. Yet such is the corruption and folly of the present age that a public spirit is treated like ignorance of the world and want of sense; and all the respect is paid to cunning men, who bend and wrest the public interest to their own private ends, that in other times hath been thought due to those who were generous enough to sacrifice their private interest to that of their country.

Such practices and such maxims as these must necessarily ruin a state. But if the contrary should prevail, we may hope to see men in power prefer the public wealth and security to their own, and men of money make free gifts, or lend it without interest to their country. This, how strange and incredible soever it may seem to us, hath been often done in other States. And the natural English temper considered, together with the force of example, no one can tell how far a proposal for a free gift may go among the monied men, when set on foot by the legislature, and encouraged by two or three men of figure, who have the spirit to do a generous thing, and the understanding to see it is every private man's interest to support that of the public.

If they who have their fortunes in money should make a voluntary gift, the public would be eased, and at the same time maintain its credit. Nor is a generous love of their country the only motive that should induce them to this. Common equity requires that all subjects should equally share the public burden; and common sense shews that those who are foremost in the danger should not be the most backward in contributing to prevent it.

Before I leave this subject, I cannot but take notice of that most infamous practice of Bribery, than which nothing can be more opposite to public spirit, since every one who takes a bribe plainly owns that he prefers his private interest to that of his country. This corruption is become a national crime, having infected the lowest as well as the highest amongst us, and is so general and notorious that, as it cannot be matched in former ages, so it is to be hoped it will not be imitated by posterity.

This calls to mind another guilt, which we possess in a very eminent degree; there being no nation under the sun where solemn Perjury is so common, or where there are such temptations to it. The making men swear so often in their own case, and where they have an interest to conceal the truth, hath gradually worn off that awful respect which was once thought due to an appeal to Almighty God; insomuch, that men now-a-days break their fast and a custom-house oath with the same peace of mind. It is a policy peculiar to us, the obliging men to perjure or betray themselves, and hath had no one good effect, but many very ill ones. Sure I am that other nations, without the hundredth part of our swearing, contrive to do their business at least as well as we do. And perhaps our legislature will think it proper to follow their example. For, whatever measures are taken, so long as we lie under such a load of guilt as national Perjury and national Bribery, it is impossible we can prosper.

This poor nation hath sorely smarted of late, and to ease the present smart, a sudden remedy (as is usual in such cases) hath been thought of. But we must beware not to mistake an anodyne for a cure. Where the vitals are touched, and the whole mass of humours vitiated, it is not enough to ease the part pained; we must look farther, and apply general correctives; otherwise the ill humour may soon shew itself in some other part.

The South-sea affair, how sensible soever, is not the original evil, or the great source of our misfortunes; it is but the natural effect of those principles which for many years have been propagated with great industry. And, as a sharp distemper, by reclaiming a man from intemperance, may prolong his life, so it is not impossible but this public calamity that lies so heavy on the nation may prevent its ruin. It would certainly prove the greatest

of blessings, if it should make all honest men of one party; if it should put religion and virtue in countenance, restore a sense of public spirit, and convince men it is a dangerous folly to pursue private aims in opposition to the good of their country; if it should turn our thought from cozenage and stock-jobbing to industry and frugal methods of life; in fine, if it should revive and inflame that native spark of British worth and honour, which hath too long lain smothered and oppressed.

With this view I have, among so many projects for remedying the ill state of our affairs in a particular instance, ventured to publish the foregoing general hints, which as they have been thrown together from a zeal for the public good, so I heartily wish they may be regarded neither more nor less than as they are fitted to promote that end.

Though it must be owned that little can be hoped if we consider the corrupt degenerate age we live in. I know it is an old folly to make peevish complaints of the times, and charge the common failures of human nature on a particular age. One may nevertheless venture to affirm that the present hath brought forth new and portentous villainies, not to be paralleled in our own or any other history. We have been long preparing for some great catastrophe. Vice and villainy have by degrees grown reputable among us; our infidels have passed for fine gentlemen, and our venal traitors for men of sense, who knew the world. We have made a jest of public spirit[16], and cancelled all respect for whatever our laws and religion repute sacred. The old English modesty is quite worn off, and instead of blushing for our crimes, we are ashamed only of piety and virtue. In short, other nations have been wicked, but we are the first who have been wicked upon principle.

The truth is, our symptoms are so bad that, notwithstanding all the care and vigilance of the legislature, it is to be feared the final period of our State approaches. Strong constitutions, whether politic or natural, do not feel light disorders. But when they are sensibly affected, the distemper is for the most part violent and of an ill prognostic. Free governments like our own were planted by the Goths in most parts of Europe; and, though we all know

[16] Cf. *Maxims concerning Patriotism*, 26.

what they are come to, yet we seem disposed rather to follow their example than to profit by it.

Whether it be in the order of things, that civil States should have, like natural products, their several periods of growth, perfection, and decay; or whether it be an effect, as seems more probable, of human folly that, as industry produces wealth, so wealth should produce vice, and vice ruin.

God grant the time be not near when men shall say: 'This island was once inhabited by a religious, brave, sincere people, of plain uncorrupt manners, respecting inbred worth rather than titles and appearances, assertors of liberty, lovers of their country, jealous of their own rights, and unwilling to infringe the rights of others; improvers of learning and useful arts, enemies to luxury, tender of other men's lives, and prodigal of their own; inferior in nothing to the old Greeks or Romans, and superior to each of those people in the perfections of the other. Such were our ancestors during their rise and greatness; but they degenerated, grew servile flatterers of men in power, adopted Epicurean notions, became venal, corrupt, injurious, which drew upon them the hatred of God and man, and occasioned their final ruin.'

A PROPOSAL

FOR

THE BETTER SUPPLYING OF CHURCHES IN OUR FOREIGN PLANTATIONS,

AND FOR

CONVERTING THE SAVAGE AMERICANS TO CHRISTIANITY,

BY A COLLEGE TO BE ERECTED IN THE SUMMER ISLANDS, OTHERWISE CALLED THE ISLES OF BERMUDA.

The harvest truly is great, but the labourers are few.—LUKE x. 2.

1725.

A PROPOSAL, &c.[1]

ALTHOUGH there are several excellent persons of the Church of England, whose good intentions and endeavours have not been wanting to propagate the Gospel in foreign parts, who have even combined into Societies for that very purpose, and given great encouragement, not only for English missionaries in the West Indies, but also for the reformed of other nations, led by their example, to propagate Christianity in the East; it is nevertheless acknowledged that there is at this day but little sense of religion, and a most notorious corruption of manners, in the English Colonies settled on the Continent of America, and the Islands. It is also acknowledged that the gospel hath hitherto made but a very inconsiderable progress among the neighbouring Americans, who still continue in much the same ignorance and barbarism in which we found them above a hundred years ago.

I shall therefore venture to submit my thoughts, upon a point that I have long considered, to better judgments, in hopes that any expedient will be favourably hearkened to which is proposed for the remedy of these evils. Now, in order to effect this, it should seem the natural proper method to provide, in the first place, a constant supply of worthy clergymen for the English churches in those parts; and, in the second place, a like constant supply of zealous missionaries, well fitted for propagating Christianity among the savages.

For, though the surest means to reform the morals, and soften the behaviour of men be, to preach to them the pure uncorrupt doctrine of the gospel, yet it cannot be denied that the success

[1] This *Proposal*, first published in London in 1725 (printed by H. Woodfall, at Elzevir's Head, without Temple Bar), announces a scheme for promoting Christian civilization in America (in the early part of last century regarded as the great field for such enterprises, cf. p. 242, note), long before projected by its author, which he came over from Ireland to London in the preceding year to promote. Dean Swift in his letter (September 3, 1724), recommending Berkeley to Lord Carteret, then at Bath, mentions that the Bermuda project had been conceived at least three years previously.

The *Proposal* was republished in the *Miscellany* in 1752.

of preaching dependeth in good measure on the character and skill of the preacher. Forasmuch as mankind are more apt to copy characters than to practise precepts, and forasmuch as argument, to attain its full strength, doth not less require the life of zeal than the weight of reason; and the same doctrine which maketh great impression when delivered with decency and address loseth very much of its force by passing through awkward or unskilful hands.

Now the clergy sent over to America have proved, too many of them, very meanly qualified both in learning and morals for the discharge of their office. And indeed little can be expected from the example or instruction of those who quit their native country on no other motive than that they are unable to procure a livelihood in it, which is known to be often the case.

To this may be imputed the small care that hath been taken to convert the negroes of our Plantations, who, to the infamy of England and scandal of the world, continue heathen under Christian masters, and in Christian countries. Which could never be, if our planters were rightly instructed and made sensible that they disappointed their own baptism by denying it to those who belong to them; that it would be of advantage to their affairs to have slaves who should 'obey in all things their masters according to the flesh, not with eye-service as men-pleasers, but in singleness of heart, as fearing God:' that gospel liberty consists with temporal servitude; and that their slaves would only become better slaves by being Christian.

And though it be allowed that some of the clergy in our Colonies have approved themselves men of merit, it will at the same time be allowed that the most zealous and able missionary from England must find himself but ill qualified for converting the American heathen, if we consider the difference of language, their wild way of living, and, above all, the great jealousy and prejudice which savage nations have towards foreigners, or innovations introduced by them.

These considerations make it evident, that a College or Seminary in those parts is very much wanted; and therefore the providing such a Seminary is earnestly proposed and recommended to all those who have it in their power to contribute to so good a work. By this, two ends would be obtained:—

First, the youth of our English Plantations might be themselves fitted for the ministry; and men of merit would be then glad to fill the churches of their native country, which are now a drain for the very dregs and refuse of ours.

At present, there are, I am told, many churches vacant in our Plantations, and many very ill supplied; nor can all the vigilance and wisdom of that great prelate[2], whose peculiar care it is, prevent this, so long as the aforesaid churches are supplied from England.

And supplied they must be with such as can be picked up in England or Ireland, until a nursery of learning for the education of the natives is founded. This indeed might provide a constant succession of learned and exemplary pastors; and what effect this might be supposed to have on their flocks I need not say.

Secondly, the children of savage Americans, brought up in such a Seminary, and well instructed in religion and learning, might make the ablest and properest missionaries for spreading the gospel among their countrymen; who would be less apt to suspect, and readier to embrace a doctrine recommended by neighbours or relations, men of their own blood and language, than if it were proposed by foreigners, who would not improbably be thought to have designs on the liberty or property of their converts.

The young Americans necessary for this purpose may, in the beginning, be procured, either by peaceable methods from those savage nations which border on our Colonies, and are in friendship with us, or by taking captive the children of our enemies.

It is proposed to admit into the aforesaid College only such savages as are under ten years of age, before evil habits have taken a deep root; and yet not so early as to prevent retaining their mother-tongue, which should be preserved by intercourse among themselves.

It is farther proposed to ground these young Americans thoroughly in religion and morality, and to give them a good tincture of other learning; particularly of eloquence, history, and practical mathematics; to which it may not be improper to add some skill in physic.

If there were a yearly supply of ten or a dozen such missionaries sent abroad into their respective countries, after they had received

[2] Bishop of London (then Bishop Gibson).

the degree of master of arts in the aforesaid College, and holy orders in England (till such time as Episcopacy be established in those parts[3]), it is hardly to be doubted but, in a little time, the world would see good and great effects thereof.

For, to any considering man, the employing American missionaries for the conversion of America will, of all others, appear the most likely method to succeed; especially if care be taken that, during the whole course of their education, an eye should be had to their mission; that they should be taught betimes to consider themselves as trained up in that sole view, without any other prospect of provision or employment; that a zeal for religion and love of their country should be early and constantly instilled into their minds, by repeated lectures and admonitions; that they should not only be incited by the common topics of religion and nature, but farther animated and inflamed by the great examples in past ages of public spirit and virtue, to rescue their countrymen from their savage manners to a life of civility and religion.

If his Majesty would graciously please to grant a Charter for a College to be erected in a proper place for these uses, it is to be hoped a fund may be soon raised, by the contribution of well-disposed persons, sufficient for building and endowing the same. For, as the necessary expense would be small, so there are men of religion and humanity in England, who would be pleased to see any design set forward for the glory of God and the good of mankind[4].

A small expense would suffice to subsist and educate the American missionaries in a plain simple manner, such as might make it easy for them to return to the coarse and poor methods of life in use among their countrymen; and nothing can contribute more to lessen this expense, than a judicious choice of the Situation where the Seminary is to stand.

Many things ought to be considered in the choice of a situation. It should be in a good air; in a place where provisions are cheap

[3] The first See established in any of the British Colonies was that of Nova Scotia, in 1787. Dr. Seabury of Connecticut was the first Bishop in the United States. He was consecrated in 1784 by Bishops of the Church in Scotland.

[4] Above £5000 was subscribed for the purpose soon after the *Proposal* was published. Cf. P.S. p. 231.

and plenty; where an intercourse might easily be kept up with all parts of America and the Islands; in a place of security, not exposed to the insults of pirates, savages, or other enemies; where there is no great trade, which might tempt the Readers or Fellows of the College to become merchants, to the neglect of their proper business; where there are neither riches nor luxury to divert or lessen their application, or to make them uneasy and dissatisfied with a homely frugal subsistence; lastly, where the inhabitants, if such a place may be found, are noted for innocence and simplicity of manners. I need not say of how great importance this point would be towards forming the morals of young students, and what mighty influence it must have on the mission.

It is evident the College long since projected in Barbadoes[5] would be defective in many of these particulars; for, though it may have its use among the inhabitants, yet a place of so high trade, so much wealth and luxury, and such dissolute morals (not to mention the great price and scarcity of provisions) must, at first sight, seem a very improper situation for a general Seminary intended for the forming missionaries, and educating youth in religion and sobriety of manners. The same objections lie against the neighbouring islands.

And, if we consider the accounts given of their avarice and licentiousness, their coldness in the practice of religion, and their aversion from propagating it (which appears in the withholding their slaves from baptism), it is to be feared, that the inhabitants in the populous parts of our Plantations on the Continent are not much fitter than those in the islands above mentioned, to influence or assist such a design. And, as to the more remote and less-frequented parts, the difficulty of being supplied with necessaries, the danger of being exposed to the inroads of savages, and, above all, the want of intercourse with other places, render them improper situations for a Seminary of religion and learning.

It will not be amiss to insert here an observation I remember to have seen in an Abstract of the Proceedings, &c., annexed to the Dean of Canterbury's[6] Sermon before the Society for the Propagation of the Gospel in Foreign Parts—that the savage

[5] By General Codrington, who died in Barbadoes in 1710, leaving his estates to the Society for the Propagation of the Gospel, in trust for the foundation of a College there.

[6] Dr. George Stanhope, Dean of Canterbury, who preached the annual Sermon before the Society, on February 19, 1714.

Indians who live on the Continent will not suffer their children to learn English or Dutch, lest they should be debauched by conversing with their European neighbours; which is a melancholy but strong confirmation of the truth of what hath been now advanced.

A general intercourse and correspondence with all the English Colonies, both on the Islands and the Continent, and with other parts of America, hath been before laid down as a necessary circumstance, the reason whereof is very evident. But this circumstance is hardly to be found. For, on the Continent, where there are neither inns, nor carriages, nor bridges over the rivers, there is no travelling by land between distant places. And the English settlements are reputed to extend along the sea-coast for the space of fifteen hundred miles. It is therefore plain there can be no convenient communication between them otherwise than by sea; no advantage therefore, in this point, can be gained by settling on the Continent.

There is another consideration which equally regards the Continent and the Islands, that the general course of trade and correspondence lies from all those Colonies to Great Britain alone. Whereas, for our present purpose, it would be necessary to pitch upon a place, if such could be found, which maintains a constant intercourse with all the other Colonies, and whose commerce lies chiefly or altogether (not in Europe, but) in America.

There is but one spot that I can find to which this circumstance agrees; and that is, the Isles of Bermuda, otherwise called the Summer Islands[7]. These, having no rich commodity or manufacture, such as sugar, tobacco, or the like, wherewithal to trade

[7] These islands, equidistant between the West Indies and British North America, and about six hundred miles from the Continent, now associated with the bright vision of Berkeley, were the dread of sailors for some time after their existence was made known, early in the sixteenth century. They are called Summer Islands from Sir George Summers (or Somers), who was wrecked there in 1609. He and his comrades were unexpectedly charmed by their place of refuge. Bermuda became famed for its delightful climate, and was a resort of Royalists and Roundheads during the troubles of the time. The poet Waller, after his condemnation by Parliament, is said to have passed months in 1643 in Bermuda, which, in his *Battle of the Summer Islands*, he has described with enthusiasm, as enjoying perpetual spring, and offering the most beautiful residence in the world. And Andrew Marvell, in his poem *Bermudas*, celebrates the

. . . 'isle so long unknown,
And yet far kinder than our own,'

with its grateful shelter,

'Safe from the storms, and prelates' rage.'

Shakespeare, too, as well as Waller and Marvell, helps to invest this romantic region with a halo of imagination. See *Tempest*, Act i. Scene 2, 'the still-vex'd Bermoothes.'

to England, are obliged to become carriers for America, as the Dutch are for Europe. The Bermudans are excellent ship-wrights and sailors, and have a great number of very good sloops, which are always passing and repassing from all parts of America. They drive a constant trade to the islands of Jamaica, Barbadoes, Antigua, &c., with butter, onions, cabbages, and other roots and vegetables, which they have in great plenty and perfection. They have also some small manufactures of joiner's work and matting, which they export to the Plantations on the Continent. Hence Bermudan sloops are oftener seen in the ports of America than in any other. And, indeed, by the best information I could get, it appears they are the only people of all the British Plantations who hold a general correspondence with the rest.

And as the commerce of Bermuda renders it a very fit place wherein to erect a Seminary, so likewise doth its situation, it being placed between our Plantations on the Continent and those in the Isles, so as equally to respect both. To which may be added, that it lies in the way of vessels passing from America to Great Britain; all which makes it plain that the youth, to be educated in a Seminary placed in the Summer Islands would have frequent opportunities of going thither and corresponding with their friends. It must indeed be owned that some will be obliged to go a long way to any one place which we suppose resorted to from all parts of our Plantations; but if we were to look out a spot the nearest approaching to an equal distance from all the rest, I believe it would be found to be Bermuda. It remains that we see whether it enjoys the other qualities or conditions laid down as well as this.

The Summer Islands are situated near the latitude of thirty-three degrees; no part of the world enjoys a purer air, or a more temperate climate, the great ocean which environs them at once moderating the heat of the south winds, and the severity of the north-west. Such a latitude on the Continent might be thought too hot; but the air in Bermuda is perpetually fanned and kept cool by sea-breezes, which render the weather the most healthy and delightful that could be wished, being (as is affirmed by persons who have long lived there) of one equal tenor almost throughout the whole year, like the latter end of a fine May; insomuch that it is resorted to as the Montpelier of America.

Nor are these isles (if we may believe the accounts given of them) less remarkable for plenty than for health; there being, besides beef, mutton, and fowl, great abundance of fruits, and garden-stuff of all kinds in perfection: to this, if we add the great plenty and variety of fish which is every day taken on their coasts, it would seem, that a Seminary could nowhere be supplied with better provisions, or cheaper than here.

About forty years ago, upon cutting down many tall cedars that sheltered their orange trees from the north wind (which sometimes blows even there so as to affect that delicate plant), great part of their orange plantations suffered; but other cedars are since grown up, and no doubt a little industry would again produce as great plenty of oranges as ever was there heretofore. I mention this because some have inferred from the present scarcity of that fruit, for which Bermuda was once so famous, that there hath been a change in the soil and climate for the worse. But this, as hath been observed, proceeded from another cause, which is now in great measure taken away.

Bermuda is a cluster of small islands, which lie in a very narrow compass, containing, in all, not quite twenty thousand acres. This group of isles is (to use Mr. Waller's expression [8]) walled round with rocks, which render them inaccessible to pirates or enemies; there being but two narrow entrances, both well guarded by forts. It would therefore be impossible to find anywhere a more secure retreat for students.

The trade of Bermuda consists only in garden-stuff, and some poor manufactures, principally of cedar and the palmetto-leaf. Bermuda hats are worn by our ladies: they are made of a sort of mat, or (as they call it) platting made of the palmetto-leaf, which is the only commodity that I can find exported from Bermuda to Great Britain; and as there is no prospect of making a fortune by this small trade, so it cannot be supposed to tempt the Fellows of the College to engage in it, to the neglect of their peculiar business, which might possibly be the case elsewhere.

[8] 'Bermuda, wall'd with rocks, who does not know?
That happy island where huge lemons grow,
And orange trees, which golden fruit do bear,
Th' Hesperian garden boasts of none so fair;
Where shining pearl, coral, and many a pound,
On the rich shore, of ambergris is found.'
WALLER's *Battle of the Summer Islands.*

Such as their trade is, such is their wealth; the inhabitants being much poorer than the other Colonies, who do not fail to despise them upon that account. But, if they have less wealth, they have withal less vice and expensive folly than their neighbours. They are represented as a contented, plain, innocent sort of people, free from avarice and luxury, as well as the other corruptions that attend those vices.

I am also informed that they are more constant attendants on Divine service, more kind and respectful to their pastor (when they have one), and shew much more humanity to their slaves, and charity to one another, than is observed among the English in the other Plantations. One reason of this may be that condemned criminals, being employed in the manufactures of sugar and tobacco, were never transported thither. But, whatever be the cause, the facts are attested by a clergyman of good credit, who lived among them.

Among a people of this character, and in a situation thus circumstantiated, it would seem that a Seminary of religion and learning might very fitly be placed. The correspondence with other parts of America, the goodness of the air, the plenty and security of the place, the frugality and innocence of the inhabitants, all conspiring to favour such a design. Thus much at least is evident, that young students would be there less liable to be corrupted in their morals; and the governing part would be easier, and better contented with a small stipend, and a retired academical life, in a corner from whence avarice and luxury are excluded, than they can be supposed to be in the midst of a full trade and great riches, attended with all that high living and parade which our planters affect, and which, as well as all fashionable vices, should be far removed from the eyes of the young American missionaries, who are to lead a life of poverty and self-denial among their countrymen.

After all, it must be acknowledged, that though everything else should concur with our wishes, yet if a set of good Governors and Teachers be wanting, who are acquainted with the methods of education, and have the zeal and ability requisite for carrying on a design of this nature, it would certainly come to nothing.

An institution of this kind should be set on foot by men of

prudence, spirit, and zeal, as well as competent learning, who should be led to it by other motives than the necessity of picking up a maintenance. For, upon this view, what man of merit can be supposed to quit his native country, and take up with a poor college subsistence in another part of the world, where there are so many considerable parishes actually void, and so many others ill supplied for want of fitting incumbents? Is it likely that Fellowships of fifty or sixty pounds a year should tempt abler or worthier men than benefices of many times their value?

And except able and worthy men do first engage in this affair, with a resolution to exert themselves in forming the manners of the youth, and giving them a proper education, it is evident the Mission and the College will be but in a very bad way. This inconvenience seems the most difficult to provide against, and if not provided against, it will be the most likely to obstruct any design of this nature. So true it is, that where ignorance or ill manners once take place in a Seminary, they are sure to be handed down in a succession of illiterate or worthless men.

But this apprehension, which seems so well grounded, that a College in any part of America would either lie unprovided, or be worse provided than their churches are, hath no place in Bermuda; there being at this time several gentlemen[9], in all respects very well qualified, and in possession of good preferments and fair prospects at home, who, having seriously considered the great benefits that may arise to the Church and to Mankind from such an undertaking, are ready to engage in it, and to dedicate the remainder of their lives to the instructing the youth of America, and prosecuting their own studies, upon a very moderate subsistence, in a retirement, so sweet and so secure, and every way so well fitted for a place of education and study, as Bermuda.

Thus much the writer hereof thought himself obliged to say of his associates. For himself he can only say that, as he values no preferment upon earth so much as that of being employed in the execution of this design, so he hopes to make up for other defects, by the sincerity of his endeavours.

In Europe, the protestant religion hath of late years considerably lost ground, and America seems the likeliest place wherein to

[9] See P.S. p. 230.

make up for what hath been lost in Europe, provided the proper methods are taken. Otherwise the Spanish missionaries in the south, and the French in the north, are making such a progress, as may one day spread the religion of Rome, and with it the usual hatred to Protestants, throughout all the savage nations of America; which would probably end in the utter extirpation of our Colonies, on the safety whereof depends so much of the nation's wealth, and so considerable a branch of his Majesty's revenue.

But, if this scheme were pursued, it would in all probability have much greater influence on the Americans than the utmost endeavours of popish emissaries can possibly have; who, from the difference of country, language, and interest, must lie under far greater difficulties and discouragements than those whom we suppose yearly sent out from Bermuda to preach among their countrymen.

It cannot indeed be denied, that the great number of poor regulars, inured to hard living, and brought up in an implicit obedience to their superiors, hath hitherto given the Church of Rome, in regard to her missions, great advantage over the reformed churches. But, from what hath been said, it is, I think, evident, that this advantage may be overbalanced by our employing American missionaries.

Nor is the honour of the crown, nation, and church of England, unconcerned in this scheme; which, it is to be hoped, will remove the reproach we have so long lain under, that we fall as far short of our neighbours of the Romish communion in zeal for propagating religion, as we surpass them in the soundness and purity of it. And at the same time that the doing what may be so easily done takes away our reproach, it will cast no small lustre on his Majesty's reign, and derive a blessing from Heaven on his administration, and those who live under the influence thereof.

Men of narrow minds have a peculiar talent at objection, being never at a loss for something to say against whatsoever is not of their own proposing. And perhaps it will be said, in opposition to this proposal, that if we thought ourselves capable of gaining converts to the Church, we ought to begin with infidels, papists, and dissenters of all denominations, at home, and to make pro-

selytes of these before we think of foreigners; and that therefore our scheme is against duty. And, farther, that, considering the great opposition which is found on the part of those who differ from us at home, no success can be expected among savages abroad; and that therefore it is against reason and experience.

In answer to this, I say, that religion like light is imparted without being diminished. That whatever is done abroad can be no hindrance or let to the conversion of infidels or others at home. That those who engage in this affair imagine they will not be missed, where there is no want of schools or clergy; but that they may be of singular service in countries but thinly supplied with either, or altogether deprived of both: that our Colonies being of the same blood, language, and religion, with ourselves, are in effect our countrymen. But that Christian charity, not being limited by those regards, doth extend to all mankind. And this may serve for an answer to the first point, that our design is against duty.

To the second point I answer; that ignorance is not so incurable as error; that you must pull down as well as build, erase as well as imprint, in order to make proselytes at home: whereas, the savage Americans, if they are in a state purely natural, and unimproved by education, they are also unincumbered with all that rubbish of superstition and prejudice, which is the effect of a wrong one. As they are less instructed, they are withal less conceited, and more teachable. And not being violently attached to any false system of their own, are so much the fitter to receive that which is true. Hence it is evident that success abroad ought not to be measured by that which we observe at home, and that the inference which was made from the difficulty of the one to the impossibility of the other, is altogether groundless.

It hath more the appearance of reason to object (what will possibly be objected by some) that this scheme hath been already tried to no purpose, several Indians having returned to their savage manners after they had been taught to write and read, and instructed in the Christian religion; a clear proof that their natural stupidity is not to be overcome by education.

In answer to this, I say, that the scheme now proposed hath never been tried, forasmuch as a thorough education in religion and morality, in Divine and human learning, doth not appear

to have been ever given to any savage American: that much is to be hoped from a man ripe in years, and well grounded in religion and useful knowledge, while little or nothing can be expected from a youth but slightly instructed in the elements of either: that from the miscarriage or gross stupidity of some, a general incapacity of all Americans cannot be fairly inferred: that they shew as much natural sense as other uncultivated nations: that the empires of Mexico and Peru were evident proofs of their capacity, in which there appeared a relish of politics and a degree of art and politeness, which no European people were ever known to have arrived at without the use of letters or of iron, and which some perhaps have fallen short of with both those advantages.

To what hath been said, it may not be improper to add, that young Americans, educated in an island at some distance from their own country, will more easily be kept under discipline till they have attained a complete education, than on the continent; where they might find opportunities of running away to their countrymen, and returning to their brutal customs, before they were thoroughly imbued with good principles and habits.

It must, nevertheless, be acknowledged a difficult attempt to plant religion among the Americans, so long as they continue their wild and roving life. He who is obliged to hunt for his daily food, will have little curiosity or leisure to receive instruction. It would seem therefore the right way, to introduce religion and civil life at the same time into that part of the world: either attempt will assist and promote the other. Those therefore of the young savages, who upon trial are found less likely to improve by academical studies, may be taught agriculture, or the most necessary trades. And when husbandmen, weavers, carpenters, and the like, have planted those useful arts among their savage countrymen, and taught them to live in settled habitations, to canton out their land and till it, to provide vegetable food of all kinds, to preserve flocks and herds of cattle, to make convenient houses, and to clothe themselves decently: this will assist the spreading the gospel among them; this will dispose them to social virtues, and enable them to see and to feel the advantages of a religious and civil education.

And that this view of propagating the gospel and civil life among the savage nations of America, was a principal motive

which induced the crown to send the first English Colonies thither, doth appear from the Charter[10] granted by King James I to the adventurers in Virginia. (See Purchas's *Pilgrims*, vol. iv. b. i. c. 9.) And it is now but just (what might then seem charitable), that these poor creatures should receive some advantage with respect to their spiritual interests from those who have so much improved their temporal by settling among them.

It is most true, notwithstanding our present corruptions, that there are to be found in no country under the sun men of better inclinations, or greater abilities for doing good, than in England. But it is as true that success, in many cases, depends not upon zeal, industry, wealth, learning, or the like faculties, so much as on the method wherein these are applied. We often see a small proportion of labour and expense in one way bring that about, which in others a much greater share of both could never effect. It hath been my endeavour to discover this way or method in the present case. What hath been done, I submit to the judgment of all good and reasonable men; who, I am persuaded, will never reject or discourage a proposal of this nature, on the score of slight objections, surmises, or difficulties, and thereby render themselves chargeable with the having prevented those good effects which might otherwise have been produced by it.

For it is, after all, possible, that unforeseen difficulties may arise in the prosecution of this design; many things may retard, and many things may threaten to obstruct it. But there is hardly any enterprise or scheme whatsoever, for the public good, in which difficulties are not often shewing themselves, and as often overcome by the blessing of God upon the prudence and resolution of the undertakers; though, for aught that appears, the present scheme is as likely to succeed, and attended with as few difficulties, as any of this kind can possibly be.

For, to any man who considers the Divine power of religion, the innate force of reason and virtue, and the mighty effects often

[10] The Charter is granted by the King expressly, because 'so noble a work may, by the Providence of Almighty God, hereafter tend to the glory of his Divine Majesty, in propagating of Christian religion to such people as yet live in darkness and miserable ignorance of the true knowledge and worship of God, and may in time bring the infidels and savages (living in those parts) to human civility, and to a settled and quiet government.'

wrought by the constant regular operations even of a weak and small cause; it will seem natural and reasonable to suppose, that rivulets perpetually issuing forth from a fountain or reservoir of learning and religion, and streaming through all parts of America, must in due time have a great effect, in purging away the ill manners and irreligion of our Colonies, as well as the blindness and barbarity of the nations round them: especially if the reservoir be in a clean and private place, where its waters, out of the way of anything that may corrupt them, remain clear and pure; otherwise they are more likely to pollute than purify the places through which they flow.

The greatness of a benefaction is rather in proportion to the number and want of the receivers than to the liberality of the giver. A wise and good man would therefore be frugal in the management of his charity: that is, contrive it so that it might extend to the greatest wants of the greatest number of his fellow-creatures. Now the greatest wants are spiritual wants, and by all accounts these are nowhere greater than in our Western Plantations, in many parts whereof Divine service is never performed for want of clergymen; in others, after such a manner and by such hands as scandalize even the worst of their own parishioners; where many English, instead of gaining converts, are themselves degenerated into heathens, being members of no church, without morals, without faith, without baptism. There can be, therefore, in no part of the Christian world a greater want of spiritual things than in our Plantations.

And, on the other hand, no part of the Gentile world are so inhuman and barbarous as the savage Americans, whose chief employment and delight consisting in cruelty and revenge; their lives must of all others be most opposite, as well to the light of nature as to the spirit of the gospel. Now, to reclaim these poor wretches, to prevent the many torments and cruel deaths which they daily inflict on each other, to contribute in any sort to put a stop to the numberless horrid crimes which they commit without remorse, and instead thereof to introduce the practice of virtue and piety, must surely be a work in the highest degree becoming every sincere and charitable Christian.

Those who wish well to religion and mankind will need no other motive to forward an undertaking calculated for the service

of both. I shall, nevertheless, beg leave to observe, that whoever would be glad to cover a multitude of sins by an extensive and well-judged charity, or whoever, from an excellent and godlike temper of mind, seeks opportunities of doing good in his generation, will be pleased to meet with a scheme that so peculiarly puts it in his power, with small trouble or expense, to procure a great and lasting benefit to the world.

Ten pounds a year would (if I mistake not) be sufficient to defray the expense of a young American in the College of Bermuda, as to diet, lodging, clothes, books, and education: and if so, the interest of two hundred pounds may be a perpetual fund for maintaining one missionary at the College for ever; and in this succession many, it is to be hoped, may become powerful instruments for converting to Christianity and civil life whole nations who now 'sit in darkness and the shadow of death,' and whose cruel brutal manners are a disgrace to human nature.

A benefaction of this kind seems to enlarge the very being of a man, extending it to distant places and to future times; inasmuch as unseen countries and after ages may feel the effects of his bounty, while he himself reaps the reward in the blessed society of all those, who, having turned 'many to righteousness, shine as the stars for ever and ever.'

[[11] *P.S.*—Since the foregoing *Proposal* was first made public, his Majesty hath been graciously pleased to grant a Charter[12] for erecting a College by the name of St. Paul's College in Bermuda, for the uses abovementioned. Which College is to contain a President and nine Fellows. The first President appointed by charter is George Berkeley, D.D., and Dean of Derry. The three Fellows named in the charter are William Thompson, Jonathan Rogers, and James King, Masters of Arts and Fellows of Trinity College near Dublin[13]. The nomination of a President is reserved to the Crown. The election of Fellows is vested in the President

[11] Added in the later issues of the *Proposal* in 1725, and also contained in the edition published in the *Miscellany*.

[12] The Charter was granted in June 1725. The subsequent difficulties and disappointments which Berkeley encountered, and the spirit in which he met them, appear in his Correspondence with Thomas Prior, in that and the three following years. He sailed for Rhode Island in September 1728.

[13] Thompson, Rogers, and King were elected Fellows of Trinity; the first in 1713, the second in 1716, and the third in 1720.

and the majority of the Fellows; as is likewise the government of the Society. The Lord Bishop of London for the time being is appointed Visitor; and such of his Majesty's principal Secretaries of State for the time being as hath America in his province is appointed Chancellor of the said College. The President and Fellows have the power of making Statutes, to be approved by the Visitor: they have also the power of conferring Degrees in all Faculties. They are obliged to maintain and educate Indian Scholars at the rate of ten pound *per annum* for each. They are obliged to transmit annual accounts of the state of the College, number of students, their progress, &c. to the Chancellor and Visitor. The aforesaid President and Fellows are licensed to hold their preferments in these Kingdoms till one year and a half be expired after their arrival in Bermuda. This Society is incorporated with the usual clauses, hath power to receive benefactions, purchase lands, keep a common seal, &c. Lastly, all in office under his Majesty are required to be aiding and assisting to the protection and preservation thereof[14].]

[14] The following paragraph is added in the 1725 edition only:—'As this College is proposed to be built and endowed by charitable contributions and subscriptions, all well-disposed persons, whether of the laity or the clergy, are desired to assist, as opportunity shall offer, in forwarding and collecting the same without loss of time; to the end that the President and Fellows may be able to set out for Bermuda in next Spring; which is proposed in case provision can be made by that time of £60 per annum for each. And it is hoped that the charity and zeal of sincere Christians will not suffer a design of this nature to be disappointed for want of necessary provision.'

This is followed (in the same edition) by a list of twenty-three persons willing to receive subscriptions, which includes the names of Dr. Arbuthnot, Archdeacon (afterwards Bishop) Benson, and Dean (afterwards Bishop) Sherlock. It is added that 'the money received by these gentlemen is to be laid out in purchasing lands or perpetual annuities for the endowment of the College, and in building and providing necessaries for the same, by order, or with the approbation of 'the Archbishop of Canterbury, Lord Chancellor King, the Duke of Newcastle (Secretary of State for the Plantations in America), and the Bishop of London, as Trustees;' and that until the subscriptions are sufficient to yield £60 a year to five persons, 'the Subscribers shall not be desired to pay in their money.'

VERSES,

ON THE

PROSPECT OF PLANTING ARTS AND LEARNING

IN

AMERICA[1].

THE Muse, disgusted at an age and clime
Barren of every glorious theme,
In distant lands now waits a better time,
Producing subjects worthy fame:

In happy climes, where from the genial sun
And virgin earth such scenes ensue,
The force of art by nature seems outdone,
And fancied beauties by the true:

In happy climes, the seat of innocence,
Where nature guides and virtue rules,
Where men shall not impose for truth and sense
The pedantry of courts and schools:

There shall be sung another golden age,
The rise of empire and of arts,
The good and great inspiring epic rage,
The wisest heads and noblest hearts.

Not such as Europe breeds in her decay;
Such as she bred when fresh and young,
When heavenly flame did animate her clay,
By future poets shall be sung.

Westward the course of empire takes its way;
The four first Acts already past,
A fifth shall close the Drama with the day;
Time's noblest offspring is the last.

[1] Published in Berkeley's *Miscellany* in 1752. The time at which they were written is doubtful. In the *Rhode Island Historical Collections*, III. 36 (see Anderson's *History of the Church of England in the Colonies*, vol. iii. p. 470, note), it is said that they were composed there; others assign them to the period of the publication of the *Proposal*, or soon after.

A SERMON,

PREACHED BEFORE THE

INCORPORATED SOCIETY

FOR THE

PROPAGATION OF THE GOSPEL IN FOREIGN PARTS:

AT THEIR

ANNIVERSARY MEETING

IN THE

PARISH CHURCH OF ST. MARY-LE-BOW,

ON FRIDAY, FEBRUARY 18, 173½.

1732.

A SERMON

PREACHED BEFORE THE SOCIETY FOR THE PROPAGATION OF THE GOSPEL[1].

'This is Life Eternal, that they may know Thee the only true God, and Jesus Christ whom Thou hast sent.'—JOHN xvii. 3.

THAT human kind were not designed merely to sojourn a few days upon this earth: that a being of such excellence as the soul of man, so capable of a nobler life, and having such a high sense of things moral and intellectual, was not created in the sole view of being imprisoned in an earthly tabernacle, and partaking a few pains and pleasures which chequer this mortal life, without aspiring to anything either above or beyond it, is a fundamental doctrine as well of natural religion as of the christian. It comes at once recommended by the authority of philosophers and evangelists. And that there actually is in the mind of man a strong instinct and desire, an appetite and tendency towards another and a better state, incomparably superior to the present, both in point of happiness and duration, is no more than every one's experience and inward feeling may inform him. The satiety and disrelish attending sensual enjoyments, the relish for things of

[1] First published in 1732, and republished in the *Miscellany*. The following Minute is prefixed to both these editions:—

'February 18, 173½.

'At the Anniversary Meeting of the Society for the Propagation of the Gospel in Foreign Parts,

'Agreed, That the thanks of the Society be given to the Reverend Mr. Dean Berkeley for his Sermon preached this day before the Society, and that he be desired to print the same.

'DAVID HUMPHREYS, *Secretary*.'

To the 1725 edition is appended, according to the custom of the Society, an Abstract of their Proceedings for the preceding year; a list of their missionaries, catechists, and schoolmasters in America; an Abstract of their Charter; and a list of the members, in alphabetical order. Honeyman, Macsparrow, Cutler, and Samuel Johnson, with whom Berkeley associated, are mentioned in the list, among the Society's missionaries in New England, with their salaries of £60 and £70.

a more pure and spiritual kind, the restless motion of the mind from one terrene object or pursuit to another, and often a flight or endeavour above them all towards something unknown, and perfective of its nature, are so many signs and tokens of this better state, which in the style of the gospel is termed Life Eternal.

And as this is the greatest good that can befal us, the very end of our being, and that alone which can crown and satisfy our wishes, and without which we shall be ever restless and uneasy; so every man who knows and acts up to his true interest must make it his principal care and study to obtain it: and, in order to this, he must endeavour to live suitably to his calling, and of consequence endeavour to make others obtain it too. For, how can a Christian shew himself worthy of his calling otherwise than by performing the duties of it? And what Christian duty is more essentially so than that of charity? And what object can be found upon earth more deserving our charity than the souls of men? Or how is it possible for the most beneficent spirit to do them better service than by promoting their best and most lasting interest, that is, by putting them in the way that leads to Eternal Life?

What this Eternal Life was, or how to come at it, were points unknown to the heathen world. It must be owned, the wise men of old, who followed the light of nature, saw, even by that light, that the soul of man was debased, and borne downwards, contrary to its natural bent, by carnal and terrene objects; and that, on the other hand, it was exalted, purged, and in some sort assimilated to the Deity, by the contemplation of truth and practice of virtue[2]. Thus much in general they saw or surmised. But then about the way and means to know the one, or perform the other, they were much at a loss. They were not agreed concerning the true end of mankind;—which, as they saw, was mistaken in the vulgar pursuits of men[2]; so they found it much more easy to confute the errors of others than to ascertain the truth themselves. Hence so many divisions and disputes about a point which it most imported them to know, insomuch as it was to give the bias to human life, and govern the whole tenor of their actions and conduct.

[2] Cf. *Siris*, sects. 294—298, 301—303, 338—341, 366, 367.

But when Life and Immortality were brought to light by the Gospel, there could remain no dispute about the chief end and felicity of man, no more than there could about the means of obtaining it, after the express declaration of our blessed Lord in the words of my text—'This is Life Eternal, that they may know thee, the only true God, and Jesus Christ whom thou hast sent.' For the right understanding of which words we must observe that by the *knowledge* of God is not meant a barren speculation, either of philosophers or scholastic divines, nor any notional tenets fitted to produce disputes and dissensions among men; but, on the contrary, a holy practical knowledge, which is the source, the root, or principle of peace and union, of faith, hope, charity, and universal obedience. A man may frame the most accurate notions, and in one sense attain the exactest knowledge of God and Christ that human faculties can reach, and yet, notwithstanding all this, be far from knowing them in that saving sense. For St. John tells us, that 'whosoever sinneth hath not seen Christ, nor known him' (John iii. 6). And again, 'He that loveth not knoweth not God' (1 John iv. 8). To know God as we ought, we must love him; and love him so as withal to love our brethren, his creatures and his children. I say, that knowledge of God and Christ which is Life Eternal implies universal charity, with all the duties ingrafted thereon, or ensuing from thence; that is to say, the love of God and man. And our Lord expressly saith, 'He that hath my commandments, and keepeth them, he it is that loveth me' (John xiv. 21). From all which it is evident that this saving knowledge of God is inseparable from the knowledge and practice of his will;—the explicit declaration whereof, and of the means to perform it are contained in the gospel, that Divine instrument of grace and mercy to the sons of men. The metaphysical knowledge of God, considered in his absolute nature or essence, is one thing, and to know him as he stands related to us as Creator, Redeemer, and Sanctifier is another. The former kind of knowledge (whatever it amounts to) hath been, and may be, in Gentiles as well as Christians, but not the latter, which is Life Eternal[3].

[3] Note how a relative and practical 'knowledge' of God, which consists in the Christian life, and which it is the main intention of this Discourse to recommend, is at the outset distinguished from a supposed absolute or metaphysical knowledge

From what hath been said, it is a plain consequence that whoever is a sincere Christian cannot be indifferent about bringing over other men to the knowledge of God and Christ; but that every one of us, who hath any claim to that title, is indispensably obliged, in duty to God and in charity to his neighbour, to desire and promote, so far as there is opportunity, the conversion of heathens and infidels, that so they may become partakers of Life and Immortality. For 'this is Life Eternal, to know thee the only true God, and Jesus Christ whom thou hast sent.'

In my present discourse upon which words, I shall,

First, Consider in general the obligation that Christians lie under, of bringing other men to the Knowledge of the only true God, and of Jesus Christ. And,

Secondly, I shall consider it in reference to this laudable Society, instituted for the Propagation of the Gospel.

And, under each head, I propose to obviate such difficulties as may seem to retard, and intermix such remarks as shall appear proper to forward so good a work.

Now, although it be very evident that we can really have neither a just zeal for the glory of God, nor a beneficent love of man, without wishing and endeavouring, as occasion serves, to spread the glad tidings of salvation, and bring those who are benighted in the shadow of death to Life Eternal, by the Knowledge of the only true God, and of Jesus Christ whom he hath sent; yet this duty, plain and undoubted as it seems, happens to be too often overlooked, even by those whose attention to other points would make one think their neglect of this not an effect of lukewarm indifference so much as of certain mistaken notions and suppositions. Two principal considerations occur, which, in this particular, seem to have slackened the industry of some, otherwise zealous and serious Christians.

One I apprehend to be this—that it is surmised the Christian

of Deity. Cf. *Alciphron*, Dial. IV. sect. 16—22, and Dial. VII., (published in the same year with this *Discourse*,) in which the nature of religious knowledge and of divine mysteries is discussed.

religion is in a declining state[4], which by many symptoms seems likely to end either in popery or a general infidelity. And that of course a prudent person has nothing to do but to make sure of his own salvation, and to acquiesce in the general tendency of things, without being at any fruitless pains to oppose what cannot be prevented, to steer against the stream, or resist a torrent, which, as it flows, gathers strength and rapidity, and in the end will be sure to overflow, and carry all before it. When a man of a desponding and foreboding spirit hath been led, by his observation of the ways of the world and the prevailing humour of our times, to think after this manner, he will be inclined to strengthen this his preconceived opinion, as is usual in other the like cases, by misapplication of Holy Scripture: for instance, by those words of our blessed Saviour, 'When the Son of man cometh, shall he find faith on the earth?' (Luke xviii. 8), which have been applied to this very purpose, as importing that, before the final judgment, Christian faith should be extinguished upon earth;—although these words do, from the context, seem plainly to refer to the destruction of Jerusalem, and the obstinate blindness of the Jews, who, even then, when they felt the hand of God, should not acknowledge it, or believe the Roman army to be the instrument of Divine vengeance, in the day of their visitation, by him whom they had injuriously treated, rejected, and put to death.

But, granting the former sense might be supported by no absurd hypothesis, or no improbable guess, yet shall the endeavours of Christian men for propagating the gospel of Christ be forestalled by any suppositions or conjectures whatsoever? Admitting, I say, those words regard the future advent of Jesus Christ, yet can any one tell how near or how far off that advent may be? Are not the times and seasons foreknown only to God? And shall we neglect a certain duty to-day, upon an uncertain surmise of what is to come hereafter? This way of thinking might furnish as strong reasons against preaching at home as abroad, within as without the pale of the church. It would be as specious an argument against the one as the other, but in reality can

[4] This *Sermon* naturally refers to prevalent forms of religious scepticism or free-thinking, which so much engaged Berkeley at the period in his life at which it was written. Cf. *Alciphron*, passim.

conclude against neither. For, as we know not when that supposed time of general infidelity is to be, or whether it will be at all; so, if it were ever so sure, and ever so near, it would nevertheless become us to take care that it may not be an effect of our own particular indifference and neglect.

But, if we take our notions, not from the uncertain interpretation of a particular text, but from the whole tenor of the Divine oracles, from the express promise and reiterated predictions of our blessed Lord and his apostles, we shall believe, that 'Jesus Christ is highly exalted of God; to the end, that at his name every knee shall bow, and every tongue confess that he is the Lord, to the glory of God the Father' (Phil. ii. 9—11). That 'he must reign till he hath put all enemies under his feet' (1 Cor. xv. 25). That 'he is with us alway, even unto the end of the world' (Matt. xxviii. 20). And that the church of the living God, the pillar and ground of truth, is so far from being destroyed by human means, 'that the gates of hell (all the infernal powers) shall not prevail against it' (Matt. xvi. 18). Let us therefore banish all such conceits as may seem to justify our indolence, as may reason us out of all courage and vigour in the race that is set before us; let us not, I say, slacken our own hands, nor enfeeble our own knees, by preconceived fancies and suppositions, considering that as the success of all enterprises in great measure depends on the spirit of the undertakers, so nothing is more apt to raise a spirit than hope; nor to depress it than despondency. We ought therefore to shake off every vain fear in our spiritual warfare. The number, the presumption, and the abilities of those who take counsel together against the Lord and against his Anointed should not dishearten, but rather excite and encourage us to stand in the gap.

Another consideration that may possibly withhold divers sincere believers from contributing their endeavours for bringing men to the knowledge of God and Christ, and thereby to Eternal Life, is—the want of Miracles in the present age. Men naturally cast about for reasons to countenance the part they take. And as the gift of miracles was of mighty influence and help to those who were commissioned to spread abroad the light of the gospel in its first promulgation, so no pretence offers itself more natu-

rally to excuse a man from executing any purpose than the want of authority, which, in the opinion of men, cannot be without a just commission, nor this unless distinguished by those proper means and powers that have been known to attend it. Now, with regard to this defect of miracles, I shall beg leave to make two observations:—

First, It is to be observed that if we have not miracles we have other advantages which make them less necessary now than in the first spreading of the gospel. Whole nations have found the benefit of Christ's religion; it is protected by princes, established and encouraged by laws, supported by learning and arts, recommended by the experience of many ages, as well as by the authority and example of the wisest and most knowing men. Certainly, if the greatest part of mankind are Gentiles or Mahometans, it cannot be denied that the most knowing, most learned, and most improved nations profess Christianity, and that even the Mahometans themselves bear testimony to the Divine mission of Jesus Christ. Whereas, therefore, in the beginning, a few illiterate wanderers, of the meanest of the people, had the prejudices, the learning, and the power of their own as well as other nations, in one word, the whole world, to oppose and overcome: those who at this day engage in the propagation of the gospel, do it upon terms in many respects far more easy and advantageous. It is power against weakness, civility against barbarism, knowledge against ignorance, some or other if not all these advantages, in the present times, attending the progress of the Christian religion, in whatever part of the world men shall attempt to plant it.

In the Second place, we may reflect that if we have not the gift of miracles this is a good reason why we should exert more strongly those human means which God hath put in our power; and make our ordinary faculties, whether of the head, or the hand, or the tongue, our interest, our credit, or our fortune, subservient to the great Giver of them; and cheerfully contribute our humble mite towards hastening that time wherein 'all nations whom thou hast made shall come and worship before thee, O Lord, and shall glorify thy name' (Psal. lxxxvi. 9). It is at least a plain case, that the want of apostolical gifts should not be pleaded as a bar to our doing that which in no respect, either of difficulty or

danger, equals or approaches the apostolical office. What pretence can this supply for men's being quite unconcerned about the spreading of the gospel, or the salvation of souls; for men's forgetting that they are Christians, and related to human kind? How can this justify their overlooking opportunities which lie in their way, their not contributing a small part of their fortune towards forwarding a design wherein they share neither pains nor peril; the not bestowing on it even the cheap assistance of their speech, attention, counsel, or countenance, as occasion offers? How unlike is this worldly, selfish indifference to that account which St. Paul gives of himself, that 'he sought not his own profit, but the profit of many, that they may be saved' (1 Cor. x. 33). And yet herein he expected the Corinthians (and the same reason will hold for us) should be like him; for he subjoins, 'Be ye followers of me as I also am of Christ.'

Having considered the duty in general, I come now to treat of it with reference to America, the peculiar province of this venerable Society[5]; which I suppose well informed of the state and progress of religion in that part of the world, by their correspondences with the clergy upon their mission. It may nevertheless be expected that one who had been engaged in a design upon this very view, who hath been upon the place, and resided a considerable time in one of our Colonies, should have observed somewhat worth reporting. It is to be hoped, therefore, that one part of my audience will pardon what the other may perhaps expect, while I detain them with the narrative of a few things I have observed, and such reflections as thereupon suggested themselves; some part of which may possibly be found to extend to other Colonies.

Rhode Island, with a portion of the adjacent Continent under the same government, is inhabited by an English Colony, consisting chiefly of sectaries of many different denominations, who seem to have worn off part of that prejudice which they inherited

[5] The original design of the Society (founded in 1701) was to spread Christianity in the parts of America subject to British dominion, and to carry it among the Indian nations beyond—America being then regarded as the opening for missions.

from their ancestors against the national Church of this land; though it must be acknowledged at the same time, that too many of them have worn off a serious sense of all religion. Several indeed of the better sort are accustomed to assemble themselves regularly on the Lord's day for the performance of divine worship; but most of those who are dispersed throughout this colony seem to rival some well-bred people of other countries in a thorough indifference for all that is sacred, being equally careless of outward worship, and of inward principles, whether of faith or practice. Of the bulk of them it may certainly be said that they live without the sacraments, not being so much as baptized: and as for their morals, I apprehend there is nothing to be found in them that should tempt others to make an experiment of their principles, either in religion or government. But it must be owned, the general behaviour of the inhabitants in those towns where churches and meetings have been long settled and regularly attended seems so much better as sufficiently to show the difference which a solemn regular worship of God makes between persons of the same blood, temper, and natural faculties.

The native Indians, who are said to have been formerly many thousands, within the compass of this colony, do not at present amount to one thousand, including every age and sex. And these are either all servants or labourers for the English, who have contributed more to destroy their bodies by the use of strong liquors than by any means to improve their minds or save their souls. This slow poison, jointly operating with the small-pox, and their wars (but much more destructive than both), have consumed the Indians, not only in our Colonies, but also far and wide upon our confines. And, having made havoc of them, is now doing the same thing by those who taught them that odious vice.

The negroes in the government of Rhode Island are about half as many more than the Indians; and both together scarce amount to a seventh part of the whole Colony. The religion of these people, as is natural to suppose, takes after that of their masters. Some few are baptized; several frequent the different assemblies: and far the greater part none at all. An ancient antipathy to the Indians—whom, it seems, our first planters (therein as in certain other particulars affecting to imitate Jews

rather than Christians) imagined they had a right to treat on the foot of Canaanites or Amalekites—together with an irrational contempt of the blacks, as creatures of another species, who had no right to be instructed or admitted to the sacraments—have proved a main obstacle to the conversion of these poor people.

To this may be added, an erroneous notion that the being baptized is inconsistent with a state of slavery. To undeceive them in this particular, which had too much weight, it seemed a proper step, if the opinion of his Majesty's Attorney and Solicitor-General could be procured. This opinion they charitably sent over, signed with their own hands; which was accordingly printed in Rhode Island, and dispersed throughout the Plantations. I heartily wish it may produce the intended effect. It must be owned, our reformed planters, with respect to the natives and the slaves, might learn from those of the Church of Rome how it is their interest and duty to behave. Both French and Spaniards have intermarried with Indians, to the great strength, security, and increase, of their Colonies. They take care to instruct both them and their negroes in the popish religion, to the reproach of those who profess a better. They have also bishops and seminaries for clergy; and it is not found that their Colonies are worse subjects, or depend less on their mother-country, on that account.

It should seem, that the likeliest step towards converting the heathen would be to begin with the English planters; whose influence will for ever be an obstacle to propagating the gospel, till they have a right sense of it themselves, which would shew them how much it is their duty to impart it to others. The missionaries employed by this venerable Society have done, and continue to do, good service, in bringing those planters to a serious sense of religion, which, it is hoped, will in time extend to others. I speak it knowingly, that the ministers of the gospel, in those provinces which go by the name of New England, sent and supported at the expense of this Society, have, by their sobriety of manners, discreet behaviour, and a competent degree of useful knowledge, shewn themselves worthy the choice of those who sent them; and particularly in living on a more friendly foot with their brethren of the separation; who, on their part, were also very much come off from that narrowness of spirit

which formerly kept them at such an unamicable distance from us. And as there is reason to apprehend that part of America could not have been thus distinguished, and provided with such a number of proper persons, if one half of them had not been supplied out of the dissenting seminaries of the country, who, in proportion as they attain to more liberal improvements of learning, are observed to quit their prejudice towards an episcopal church: so I verily think it might increase the number of such useful men, if provision were made to defray their charges in coming hither to receive holy orders;—passing and repassing the ocean, and tarrying the necessary time in London, requiring an expense that many are not able to bear. It would also be an encouragement to the missionaries in general, and probably produce good effects, if the allowance of certain missionaries were augmented, in proportion to the services they had done, and the time they had spent in their mission. These hints I venture to suggest, as not unuseful in an age wherein all human encouragements are found more necessary than at the first propagation of the gospel. But they are, with all due deference and respect, submitted to the judgment of this venerable audience.

After all, it is hardly to be expected that, so long as Infidelity prevails at home, the Christian religion should thrive and flourish in our Colonies abroad. Mankind, it must be owned, left to themselves, are so much bewildered and benighted with respect to the origin of that evil which they feel, and from which they are at a loss about the means of being freed, that the doctrines of the lapsed state of man, his reconciliation by Christ, and regeneration by the Spirit, may reasonably be hoped to find an easy admission—as bringing with them light and comfort, into a mind not hardened by impenitency, nor foreclosed by pride, nor biassed by prejudice. But such is the vanity of man that no prejudice operates more powerfully than that in favour of fashion; and no fashions are so much followed by our Colonies as those of the mother-country, which they often adopt in their modes of living, to their great inconvenience, without allowing for the disparity of circumstance or climate. This same humour hath made Infidelity (as I find it too credibly reported) spread in some of our wealthy Plantations; uneducated men being more

apt to tread in the steps of libertines and men of fashion, than to model themselves by the laws and institutions of their mother-country, or the lives and professions of the virtuous and religious part of it.

But this is not all. While those abroad are less disposed to receive, some at home are, perhaps, less disposed to propagate the gospel, from the same cause. It is to be feared, I say, that the prevailing torrent of Infidelity, which staggers the faith of some, may cool the zeal and damp the spirit of others, who, judging from the event and success of those who impugn the Church of Christ, may possibly entertain some scruple or surmise, whether it may not be, for the present at least, abandoned by Providence, and that human care must ineffectually interpose, till it shall please God, 'yet once more to shake not the earth only, but also the heavens.' This point had been touched before, but deserves farther consideration: to the end, that the peculiar impiety of a profane age, may not be a bar to those very endeavours, which itself renders more necessary, and calls for more loudly now than ever.

Whatever man may think, the arm of the Lord is not shortened. In all this prevalency of Atheism and Irreligion, there is no advantage gained by the powers of darkness, either against God, or godly men, but only against their own wretched partisans. The Christian dispensation, is a dispensation of grace and favour. The Christian Church a society of men entitled to this grace, on performing certain conditions. If this society is diminished, as those who remain true members of it suffer no loss to themselves, so God loseth no right, suffereth no detriment, foregoeth no good; his grace resisted or unfruitful being no more lost to him than the light of the sun shining on desert places, or among people who shut their eyes.

Besides, this excess, this unstemmed torrent of profaneness, may possibly, in the conclusion, defeat itself, confirm what it meant to extirpate, and, instead of destroying, prove a means of preserving our religion; the evil fruits and effects thereof being so notorious and flagrant, and so sensibly felt, as in all likelihood to be able to open the eyes and rouse the attention of those who may be blind and deaf to every argument and consideration. Or, who knows but the Christian Church, cor-

rupted by prosperity, is to be restored and purified by adversity? which may prove, for aught we can tell, as salutary in future as it hath been in past ages. Many insolent and presumptuous foes have set themselves against the Church of God; whose hook nevertheless may be in their nostrils, and his bridle in their lips, managing and governing even their rage and folly to the fulfilling of his own wise purposes; and who may not fail in the end to deal by them as he did by the king of Assyria, when he had 'performed his work upon Sion and upon Jerusalem, punishing their stout heart and high looks' (Isa. x. 12). This presumptuous conqueror was, without knowing it, a tool or instrument in the hands of that God whom he blasphemed. 'O Assyrian, the rod of mine anger! I will send him against a hypocritical nation, and against the people of my wrath will I give him a charge to take the spoil, and to take the prey, and to tread them down like the mire of the streets. Howbeit he meaneth not so, neither doth his heart think so, but it is in his heart to destroy and cut off nations not a few' (Isa. x. 5—7).

Thus much at least is evident: it is no new thing that great enormities should produce great humiliations, and these again noble virtues, which have often recovered both single men, and whole states, even in a natural and civil sense. And if the captivities, distresses, and desolations of the Jewish church have occasioned their return to God, and reinstated them in his favour; nay, if it was actually foretold, whenever they lay under the curse of God, at the mercy of their enemies, peeled and scattered in a foreign land, that nevertheless upon their calling his covenant to mind, and returning to him, 'the Lord their God would turn their captivity and have compassion upon them' (Deut. xxx. 3). —I say, if things were so, why may we not in reason hope for something analogous thereto in behalf of the Christian Church. It cannot be denied, that there was a great analogy between the Jewish institutions, and the doctrines of the gospel; for instance, between the paschal lamb, and the Lamb of God slain from the foundation of the world; between the Egyptian bondage, and that of sin; the earthly Canaan, and the heavenly; the fleshly circumcision, and the spiritual. In these and many other particulars the analogy seems so plain that it can hardly be disputed. To be

convinced that the law of Moses and the Jewish economy were figures and shadows of the evangelical, we need only look into the Epistle to the Hebrews. May we not therefore, in pursuance of this same analogy, suppose a similar treatment of the Jewish and Christian Church?

Let us then see, on what terms the former stood with God, in order to discover what the latter may reasonably expect. The solemn denunciation to the Jews was, 'If thou shalt hearken diligently unto the voice of the Lord thy God, to observe and to do all his commandments which I command thee this day, that the Lord thy God will set thee on high above all the nations of the earth' (Deut. xxviii. 1). But, in case of disobedience, it is added among many other threats and maledictions, 'The Lord shall smite thee with blasting and with mildew: and thy heaven that is over thy head shall be brass, and the earth that is under thee shall be iron' (Deut. xxviii. 22, 23). And again, 'The Lord shall smite thee with madness, and blindness, and astonishment of heart' (Deut. xxviii. 28). Have not the people of this land drawn down upon it, by more ways than one, the just judgments of Heaven? Surely we have felt in a metaphor the first of the forementioned judgments; and the last hath been literally fulfilled upon us. Is it not visible that we are less knowing, less virtuous, less reasonable, in proportion as we are less religious? Are we not grown drunk and giddy with vice, and vanity, and presumption, and free-thinking, and extravagance of every kind, to a degree that we may truly be said to be smitten with madness, and blindness, and astonishment of heart?

As anciently most unchristian schisms and disputes, joined with great corruption of manners, made way for the Mahometan in the east, and the papal dominion in the west; even so here at home in the last century, a weak reliance upon human politics and power on the one hand, and enthusiastic rage on the other, together with carnal mindedness on both, gave occasion to introduce Atheism and Infidelity. If the temporal state and outward form of the Jewish church was, upon their defection, overturned by invaders; in like manner, when Christians are no longer governed by the light of evangelical truth, when we resist the Spirit of God, are we not to expect that 'the heaven above will be as

brass,' that the Divine grace will no longer shower down on our obdurate hearts, that our Church and profession will be blasted by licentious scorners, those madmen who in sport scatter firebrands, arrows, and death? As all this is no more than we may reasonably suppose will ensue upon our backsliding, so we may, with equal reason, hope it will be remedied upon our return to God.

From what hath been said it follows—that in order to propagate the Gospel abroad, it is necessary we do it at home, and extend our charity to domestic infidels, if we would convert or prevent foreign ones. So that a view of the declining state of religion here at home, of those things that produced this declension, and of the proper methods to repair it, is naturally connected with the subject of this discourse. I shall therefore beg your patience, while I just mention a few remarks or hints, too obvious, perhaps, in themselves to be new or unknown to any present, but too little visible in their effects to make one think they are, by all, much attended to.

Some, preferring points notional or ritual to the love of God and man, consider the national Church only as it stands opposed to other Christian societies. These generally have a zeal without knowledge, and the effects are suitable to the cause; they really hurt what they seem to espouse. Others, more solicitous about the discovery of truth than the practice of holiness, employ themselves rather to spy out errors in the Church than enforce its precepts. These, it is to be feared, postpone the great interests of religion to points of less concern in any eyes but their own. But surely they would do well to consider that an humble, though confused and indistinct, faith, in the bond of charity, and productive of good works, is much more evangelical than any accurate disputing and conceited knowledge.

A Church which contains the fundamentals, and nothing subversive of those fundamentals, is not to be set at nought by any particular member; because it may not, in every point, perhaps, correspond with his ideas, no, not though he is sure of being in the right. Probably there never was, or will be, an established Church in this world without visible marks of humanity upon it. St. Paul supposeth that, 'on the foundation of Jesus Christ there

will be human superstructures of hay and stubble' (1 Cor. iii. 12), things light and trivial, wrong or superstitious, which indeed is a natural consequence of the weakness and ignorance of man. But where that living foundation is rightly laid in the mind, there will not fail to grow and spring from thence those virtues and graces, which are the genuine effects and tokens of true faith, and which are by no means inconsistent with every error in theory, or every needless rite in worship.

The Christian religion was calculated for the bulk of mankind, and therefore cannot reasonably be supposed to consist in subtle and nice notions. From the time that divinity was considered as a science, and human reason enthroned in the sanctuary of God, the hearts of its professors seem to have been less under the influence of grace. From that time have grown many unchristian dissensions and controversies, of men 'knowing nothing, but doting about questions and strifes of words, whereof cometh envy, strife, railings, evil surmises, perverse disputings of men of corrupt minds and destitute of truth' (1 Tim. vi. 4, 5). Doubtless, the making religion a notional thing hath been of infinite disservice. And whereas its holy mysteries are rather to be received with humility of faith, than defined and measured by the accuracy of human reason; all attempts of this kind, however well intended, have visibly failed in the event; and, instead of reconciling infidels, have, by creating disputes and heats among the professors of Christianity, given no small advantage to its enemies.

To conclude: if we proportioned our zeal to the importance of things; if we could love men whose opinions we do not approve; if we knew the world more and liked it less; if we had a due sense of the Divine perfection and our own defects; if our chief study was the wisdom from above, described by St. Paul; and if, in order to all this, that were done in places of education which cannot be done so well out of them—I say, if these steps were taken at home, while proper measures are carrying on abroad, the one would very much forward or facilitate the other. As it is not meant so it must not be understood, that foreign attempts should wait for domestic success, but only that it is to be wished they may co-operate. Certainly if a just and rational, a genuine and sincere, a warm and vigorous piety, ani-

mated the Mother-country, the influence thereof would soon reach our foreign Plantations, and extend throughout their borders. We should soon see religion shine forth with new lustre and force, to the conversion of infidels, both at home and abroad, and to 'the casting down imaginations, and every high thing that exalteth itself against the knowledge of God, and bringing into captivity every thought to the obedience of Christ' (2 Cor. x. 5).

To whom, with the Father, and the Holy Ghost, be ascribed all praise, might, majesty, and dominion, now and for ever.

THE ANALYST;

OR, A DISCOURSE ADDRESSED TO AN INFIDEL MATHEMATICIAN.

WHEREIN IT IS EXAMINED WHETHER THE OBJECT, PRINCIPLES, AND INFERENCES OF THE MODERN ANALYSIS ARE MORE DISTINCTLY CONCEIVED, OR MORE EVIDENTLY DEDUCED, THAN RELIGIOUS MYSTERIES AND POINTS OF FAITH.

'First cast out the beam out of thine own eye; and then shalt thou see clearly to cast out the mote out of thy brother's eye.'—MATT. c. VII. v. 5.

1734.

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THE ANALYST:

A DISCOURSE ADDRESSED TO AN INFIDEL MATHEMATICIAN[1].

1. THOUGH I am a stranger to your person, yet I am not, Sir, a stranger to the reputation you have acquired in that branch of learning which hath been your peculiar study; nor to the authority that you therefore assume in things foreign to your profession; nor to the abuse that you, and too many more of the like

[1] The *Analyst*, 'by the author of the *Minute Philosopher*,' was first published 'by J. Tonson in the Strand,' in March 1734—the month in which its author was promoted to the bishopric of Cloyne, and within the period of his residence in London, after his return from America. He was then engaged with the Free-thinkers. The *Analyst*, addressed to Dr. Halley, belongs to that discussion. It is an *argumentum ad hominem*, as regards the mathematician, but virtually an analogical vindication of the mysteries of religious faith. Mathematicians, so Berkeley argues, unreasonably complain of the scientific incomprehensibility of religion—seeing that their own science is itself ultimately incomprehensible, and contains conclusions supported by reasonings which are speculatively insufficient.

The Newtonian doctrine of Fluxions is the example offered by him in proof of this. Fluxions and moments, he urges, are unrepresentable in imagination; and the demonstrations by which they are supported, however useful in regard to the result reached, are in a strictly scientific view unsatisfactory. Mathematicians, in short, accept in their own science what they reject in Christianity: fluxions, like Christianity, when resolved into their first principles, involve conceptions which transcend human understanding; and, as expounded by Newton, contain reasonings which cannot be reconciled with logic, although mathematicians are ready to receive them on his authority.

In his criticism of the Newtonian doctrine, Berkeley makes a perfectly legitimate use of the weapons afforded him by the ill-defined groundwork of the method as he found it. Mr. De Morgan, indeed, in his paper on the *Early History of Infinitesimals in England*, maintains that Newton's doctrine was different at different periods; that up to 1704 he used infinitely small quantities; that in that year, in his *Quadratura Curvarum*, he renounced the infinitely small quantity, but in a manner which would lead one to suppose he had never held it; that Berkeley, in the *Analyst*, could not, or would not, see that the Newton of 1687 and the Newton of 1704 were of two different modes of thought; and that he accordingly arrays the infinitely small moments of the *Principia*, and their rejection in comparison of finite quantities, against the declaration of the *Quadratura Curvarum*, that the smallest possible errors must not be neglected.

The reasonings in the *Analyst* were foreshadowed in the *Principles of Human Knowledge* (sect. 123—134), almost a quarter of a century before. The discussion of the function of language in relation to general ideas, in the 'Introduction' to the *Principles*, and in relation to the mysteries of faith, in *Alciphron*, Dial. VII., may be compared with the following tract.

The publication of the *Analyst* was the signal for a mathematico-metaphysical or mathematico-theological controversy which lasted for years, which gave rise to more than thirty pamphlets and articles, and in which some of the chief British mathematicians of the time were involved. (Cf. pp. 301—302, note.)

character, are known to make of such undue authority, to the misleading of unwary persons in matters of the highest concernment, and whereof your mathematical knowledge can by no means qualify you to be a competent judge. Equity indeed and good sense would incline one to disregard the judgment of men, in points which they have not considered or examined. But several who make the loudest claim to those qualities do nevertheless the very thing they would seem to despise, clothing themselves in the livery of other men's opinions, and putting on a general deference for the judgment of you, Gentlemen, who are presumed to be of all men the greatest masters of reason, to be most conversant about distinct ideas, and never to take things upon trust, but always clearly to see your way, as men whose constant employment is the deducing truth by the justest inference from the most evident principles. With this bias on their minds, they submit to your decisions where you have no right to decide. And that this is one short way of making Infidels, I am credibly informed.

2. Whereas then it is supposed that you apprehend more distinctly, consider more closely, infer more justly, and conclude more accurately than other men, and that you are therefore less religious because more judicious, I shall claim the privilege of a Free-thinker; and take the liberty to inquire into the object, principles, and method of demonstration admitted by the mathematicians of the present age, with the same freedom that you presume to treat the principles and mysteries of Religion; to the end that all men may see what right you have to lead, or what encouragement others have to follow you. It hath been an old remark, that Geometry is an excellent Logic. And it must be owned that when the definitions are clear; when the postulata cannot be refused, nor the axioms denied; when from the distinct contemplation and comparison of figures, their properties are derived, by a perpetual well-connected chain of consequences, the objects being still kept in view, and the attention ever fixed upon them; there is acquired a habit of reasoning, close and exact and methodical—which habit strengthens and sharpens the mind, and being transferred to other subjects is of general use in the inquiry after truth. But how far this is the case of our geometrical analysts, it may be worth while to consider.

3. The method of Fluxions is the general key by help whereof the modern mathematicians unlock the secrets of Geometry, and consequently of Nature. And, as it is that which hath enabled them so remarkably to outgo the ancients in discovering theorems and solving problems, the exercise and application thereof is become the main if not sole employment of all those who in this age pass for profound geometers. But whether this method be clear or obscure, consistent or repugnant, demonstrative or precarious, as I shall inquire with the utmost impartiality, so I submit my inquiry to your own judgment, and that of every candid reader.—Lines are supposed to be generated[2] by the motion of points, planes by the motion of lines, and solids by the motion of planes. And whereas quantities generated in equal times are greater or lesser according to the greater or lesser velocity wherewith they increase and are generated, a method hath been found to determine quantities from the velocities of their generating motions. And such velocities are called fluxions: and the quantities generated are called flowing quantities. These fluxions are said to be nearly as the increments of the flowing quantities, generated in the least equal particles of time; and to be accurately in the first proportion of the nascent, or in the last of the evanescent increments. Sometimes, instead of velocities, the momentaneous increments or decrements of undetermined flowing quantities are considered, under the appellation of moments.

4. By moments we are not to understand finite particles. These are said not to be moments, but quantities generated from moments, which last are only the nascent principles of finite quantities. It is said that the minutest errors are not to be neglected in mathematics: that the fluxions are celerities, not proportional to the finite increments, though ever so small; but only to the moments or nascent increments, whereof the proportion alone, and not the magnitude, is considered. And of the aforesaid fluxions there be other fluxions, which fluxions of fluxions are called second fluxions. And the fluxions of these second fluxions are called third fluxions: and so on, fourth, fifth, sixth, &c. *ad infinitum*. Now, as our Sense is strained and puzzled with the

[2] [*Introd. ad Quadraturam Curvarum.*] —Author. In this and the three following sections, we have a summary of the mysteries involved in the Newtonian fluxions, and also in the *Calculus* of the continental mathematicians—as objects of mental apprehension.

perception of objects extremely minute, even so the Imagination, which faculty derives from sense, is very much strained and puzzled to frame clear ideas of the least particles of time, or the least increments generated therein: and much more so to comprehend the moments, or those increments of the flowing quantities in *statu nascenti*, in their very first origin or beginning to exist, before they become finite particles. And it seems still more difficult to conceive the abstracted velocities of such nascent imperfect entities. But the velocities of the velocities—the second, third, fourth, and fifth velocities, &c.—exceed, if I mistake not, all human understanding. The further the mind analyseth and pursueth these fugitive ideas the more it is lost and bewildered; the objects, at first fleeting and minute, soon vanishing out of sight. Certainly, in any sense, a second or third fluxion seems an obscure Mystery. The incipient celerity of an incipient celerity, the nascent augment of a nascent augment, *i.e.* of a thing which hath no magnitude—take it in what light you please, the clear conception of it will, if I mistake not, be found impossible; whether it be so or no I appeal to the trial of every thinking reader. And if a second fluxion be inconceivable, what are we to think of third, fourth, fifth fluxions, and so on without end?

5. The foreign mathematicians are supposed by some, even of our own, to proceed in a manner less accurate, perhaps, and geometrical, yet more intelligible. Instead of flowing quantities and their fluxions, they consider the variable finite quantities as increasing or diminishing by the continual addition or subduction of infinitely small quantities. Instead of the velocities wherewith increments are generated, they consider the increments or decrements themselves, which they call differences, and which are supposed to be infinitely small. The difference of a line is an infinitely little line; of a plane an infinitely little plane. They suppose finite quantities to consist of parts infinitely little, and curves to be polygons, whereof the sides are infinitely little, which by the angles they make one with another determine the curvity of the line. Now to conceive a quantity infinitely small—that is, infinitely less than any sensible or imaginable quantity, or any the least finite magnitude—is, I confess, above my capacity. But to conceive a part of such infinitely small quantity that shall be still infinitely less than it, and consequently though multiplied

infinitely shall never equal the minutest finite quantity, is, I suspect, an infinite difficulty to any man whatsoever; and will be allowed such by those who candidly say what they think; provided they really think and reflect, and do not take things upon trust.

6. And yet in the *calculus differentialis*, which method serves to all the same intents and ends with that of fluxions, our modern analysts are not content to consider only the differences of finite quantities: they also consider the differences of those differences, and the differences of the differences of the first differences: and so on *ad infinitum*. That is, they consider quantities infinitely less than the least discernible quantity; and others infinitely less than those infinitely small ones; and still others infinitely less than the preceding infinitesimals, and so on without end or limit. Insomuch that we are to admit an infinite succession of infinitesimals, each infinitely less than the foregoing, and infinitely greater than the following. As there are first, second, third, fourth, fifth, &c. fluxions, so there are differences, first, second, third, fourth, &c. in an infinite progression towards nothing, which you still approach and never arrive at. And (which is most strange) although you should take a million of millions of these infinitesimals, each whereof is supposed infinitely greater than some other real magnitude, and add them to the least given quantity, it shall never be the bigger. For this is one of the modest *postulata* of our modern mathematicians, and is a corner-stone or ground-work of their speculations.

7. All these points, I say, are supposed and believed by certain rigorous exactors of evidence in religion, men who pretend to believe no further than they can see. That men who have been conversant only about clear points should with difficulty admit obscure ones might not seem altogether unaccountable. But he who can digest a second or third fluxion, a second or third difference, need not, methinks, be squeamish about any point in Divinity. There is a natural presumption that men's faculties are made alike. It is on this supposition that they attempt to argue and convince one another. What therefore shall appear evidently impossible and repugnant to one may be presumed the same to another. But with what appearance of reason shall any man presume to say that mysteries may not be objects of faith, at the

same time that he himself admits such obscure mysteries to be the object of science?

8. It must indeed be acknowledged the modern mathematicians do not consider these points as mysteries, but as clearly conceived and mastered by their comprehensive minds. They scruple not to say that by the help of these new analytics they can penetrate into infinity itself: that they can even extend their views beyond infinity: that their art comprehends not only infinite, but infinite of infinite (as they express it), or an infinity of infinites. But, notwithstanding all these assertions and pretensions, it may be justly questioned whether, as other men in other inquiries are often deceived by words or terms, so they likewise are not wonderfully deceived and deluded by their own peculiar signs, symbols, or species. Nothing is easier than to devise expressions or notations for fluxions and infinitesimals of the first, second, third, fourth, and subsequent orders, proceeding in the same regular

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form without end or limit *x. x. x. x &c.* or *dx. ddx. dddx. ddddx. &c.* These expressions, indeed, are clear and distinct, and the mind finds no difficulty in conceiving them to be continued beyond any assignable bounds. But if we remove the veil and look underneath, if, laying aside the expressions, we set ourselves attentively to consider the things themselves which are supposed to be expressed or marked thereby, we shall discover much emptiness, darkness, and confusion; nay, if I mistake not, direct impossibilities and contradictions. Whether this be the case or no, every thinking reader is entreated to examine and judge for himself.

9. Having considered the object, I proceed to consider the principles of this new analysis by momentums, fluxions, or infinitesimals; wherein if it shall appear that your capital points, upon which the rest are supposed to depend, include error and false reasoning; it will then follow that you, who are at a loss to conduct yourselves, cannot with any decency set up for guides to other men. The main point in the method of fluxions is to obtain the fluxion or momentum of the rectangle or product of two intermediate quantities. Inasmuch as from thence are derived rules for obtaining the fluxions of all other products and powers; be the coefficients or the indexes what they will, integers

or fractions, rational or surd. Now, this fundamental point one would think should be very clearly made out, considering how much is built upon it, and that its influence extends throughout the whole analysis. But let the reader judge. This is given for demonstration[3]. Suppose the product or rectangle $A\,B$ increased by continual motion: and that the momentaneous increments of the sides A and B are a and b. When the sides A and B were deficient, or lesser by one half of their moments, the rectangle was $\overline{A-\frac{1}{2}a} \times \overline{B-\frac{1}{2}b}$, i. e. $A\,B-\frac{1}{2}a\,B-\frac{1}{2}b\,A+\frac{1}{4}a\,b$. And as soon as the sides A and B are increased by the other two halves of their moments, the rectangle becomes $\overline{A+\frac{1}{2}a} \times \overline{B+\frac{1}{2}b}$ or $A\,B+\frac{1}{2}a\,B+\frac{1}{2}b\,A+\frac{1}{4}a\,b$. From the latter rectangle subduct the former, and the remaining difference will be $a\,B+b\,A$. Therefore the increment of the rectangle generated by the entire increments a and b is $a\,B+b\,A$. *Q. E. D.* But it is plain that the direct and true method to obtain the moment or increment of the rectangle $A\,B$, is to take the sides as increased by their whole increments, and so multiply them together, $A+a$ by $B+b$, the product whereof $A\,B+a\,B+b\,A+a\,b$ is the augmented rectangle; whence, if we subduct $A\,B$ the remainder $a\,B+b\,A+a\,b$ will be the true increment of the rectangle, exceeding that which was obtained by the former illegitimate and indirect method by the quantity $a\,b$. And this holds universally by the quantities a and b be what they will, big or little, finite or infinitesimal, increments, moments, or velocities. Nor will it avail to say that $a\,b$ is a quantity exceeding small: since we are told that *in rebus mathematicis errores quam minimi non sunt contemnendi.*

10. [4]Such reasoning as this for demonstration, nothing but the obscurity of the subject could have encouraged or induced the great author of the fluxionary method to put upon his followers, and nothing but an implicit deference to authority could move them to admit. The case indeed is difficult. There can be nothing done till you have got rid of the quantity $a\,b$. In order to this the notion of fluxions is shifted: it is placed in various lights: points which should be clear as first principles are puzzled; and terms which should be steadily used are ambiguous. But, notwithstanding all this address and skill, the point of getting rid

[3] [*Naturalis Philosophiæ Principia Mathematica*, lib. II. lem. 2.]—Author.
[4] [*Introd. ad Quadraturam Curvarum.*]—Author.

of ab cannot be obtained by legitimate reasoning. If a man, by methods not geometrical or demonstrative, shall have satisfied himself of the usefulness of certain rules; which he afterwards shall propose to his disciples for undoubted truths; which he undertakes to demonstrate in a subtle manner, and by the help of nice and intricate notions; it is not hard to conceive that such his disciples may, to save themselves the trouble of thinking, be inclined to confound the usefulness of a rule with the certainty of a truth, and accept the one for the other; especially if they are men accustomed rather to compute than to think; earnest rather to go on fast and far, than solicitous to set out warily and see their way distinctly.

11. The points or mere limits of nascent lines are undoubtedly equal, as having no more magnitude one than another, a limit as such being no quantity. If by a momentum you mean more than the very initial limit, it must be either a finite quantity or an infinitesimal. But all finite quantities are expressly excluded from the notion of a momentum. Therefore the momentum must be an infinitesimal. And, indeed, though much artifice hath been employed to escape or avoid the admission of quantities infinitely small, yet it seems ineffectual. For aught I see, you can admit no quantity as a medium between a finite quantity and nothing, without admitting infinitesimals. An increment generated in a finite particle of time is itself a finite particle; and cannot therefore be a momentum. You must therefore take an infinitesimal part of time wherein to generate your momentum. It is said, the magnitude of moments is not considered; and yet these same moments are supposed to be divided into parts. This is not easy to conceive, no more than it is why we should take quantities less than A and B in order to obtain the increment of AB, of which proceeding it must be owned the final cause or motive is obvious; but it is not so obvious or easy to explain a just and legitimate reason for it, or show it to be geometrical.

12. From the foregoing principle, so demonstrated, the general rule for finding the fluxion of any power of a flowing quantity is derived[5]. But, as there seems to have been some inward scruple or consciousness of defect in the foregoing demonstration, and as this finding the fluxion of a given power is a point of

[5] [*Philosophiæ Naturalis Principia Mathematica*, lib. II. lem. 2.]—AUTHOR.

primary importance, it hath therefore been judged proper to demonstrate the same in a different manner, independent of the foregoing demonstration. But whether this other method be more legitimate and conclusive than the former, I proceed now to examine; and in order thereto shall premise the following lemma:— 'If, with a view to demonstrate any proposition, a certain point is supposed, by virtue of which certain other points are attained; and such supposed point be itself afterwards destroyed or rejected by a contrary supposition; in that case, all the other points attained thereby, and consequent thereupon, must also be destroyed and rejected, so as from thenceforward to be no more supposed or applied in the demonstration.' This is so plain as to need no proof.

13. Now, the other method of obtaining a rule to find the fluxion of any power is as follows. Let the quantity x flow uniformly, and be it proposed to find the fluxion of x^n. In the same time that x by flowing becomes $x+o$, the power x^n becomes $\overline{x+o}\,|^n$, *i.e.* by the method of infinite series

$$x^n + nox^{n-1} + \frac{nn-n}{2}oox^{n-2} + \&c.,$$

and the increments

$$o \text{ and } nox^{n-1} + \frac{nn-n}{2}oox^{n-2} + \&c.$$

are one to another as

$$1 \text{ to } nx^{n-1} + \frac{nn-n}{2}ox^{n-2} + \&c.$$

Let now the increments vanish, and their last proportion will be 1 to nx^{n-1}. But it should seem that this reasoning is not fair or conclusive. For when it is said, let the increments vanish, *i.e.* let the increments be nothing, or let there be no increments, the former supposition that the increments were something, or that there were increments, is destroyed, and yet a consequence of that supposition, *i.e.* an expression got by virtue thereof, is retained. Which, by the foregoing lemma, is a false way of reasoning. Certainly when we suppose the increments to vanish, we must suppose their proportions, their expressions, and everything else derived from the supposition of their existence, to vanish with them.

14. To make this point plainer, I shall unfold the reasoning, and propose it in a fuller light to your view. It amounts therefore

to this, or may in other words be thus expressed. I suppose that the quantity x flows, and by flowing is increased, and its increment I call o, so that by flowing it becomes $x+o$. And as x increaseth, it follows that every power of x is likewise increased in a due proportion. Therefore as x becomes $x+o$, x^n will become $\overline{x+o}|^n$: that is, according to the method of infinite series,

$$x^n + nox^{n-1} + \frac{nn-n}{2} oox^{n-2} + \&c.$$

And if from the two augmented quantities we subduct the root and the power respectively, we shall have remaining the two increments, to wit,

$$o \text{ and } nox^{n-1} + \frac{nn-n}{2} oox^{n-2} + \&c.$$

which increments, being both divided by the common divisor o, yield the quotients

$$1 \text{ and } nx^{n-1} + \frac{nn-n}{2} ox^{n-2} + \&c.,$$

which are therefore exponents of the ratio of the increments. Hitherto I have supposed that x flows, that x hath a real increment, that o is something. And I have proceeded all along on that supposition, without which I should not have been able to have made so much as one single step. From that supposition it is that I get at the increment of x^n, that I am able to compare it with the increment of x, and that I find the proportion between the two increments. I now beg leave to make a new supposition contrary to the first, *i.e.* I will suppose that there is no increment of x, or that o is nothing; which second supposition destroys my first, and is inconsistent with it, and therefore with everything that supposeth it. I do nevertheless beg leave to retain nx^{n-1}, which is an expression obtained in virtue of my first supposition, which necessarily presupposed such supposition, and which could not be obtained without it. All which seems a most inconsistent way of arguing, and such as would not be allowed of in Divinity.

15. Nothing is plainer than that no just conclusion can be directly drawn from two inconsistent suppositions. You may indeed suppose anything possible; but afterwards you may not suppose anything that destroys what you first supposed: or, if you do, you must begin *de novo*. If therefore you suppose that the augments vanish, *i.e.* that there are no augments, you are to

begin again and see what follows from such supposition. But nothing will follow to your purpose. You cannot by that means ever arrive at your conclusion, or succeed in what is called by the celebrated author, the investigation of the first or last proportions of nascent and evanescent quantities, by instituting the analysis in finite ones. I repeat it again: you are at liberty to make any possible supposition: and you may destroy one supposition by another: but then you may not retain the consequences, or any part of the consequences, of your first supposition so destroyed. I admit that signs may be made to denote either anything or nothing: and consequently that in the original notation $x+o$, o might have signified either an increment or nothing. But then, which of these soever you make it signify, you must argue consistently with such its signification, and not proceed upon a double meaning: which to do were a manifest sophism. Whether you argue in symbols or in words the rules of right reason are still the same. Nor can it be supposed you will plead a privilege in mathematics to be exempt from them.

16. If you assume at first a quantity increased by nothing, and in the expression $x+o$, o stands for nothing, upon this supposition, as there is no increment of the root, so there will be no increment of the power; and consequently there will be none except the first of all those members of the series constituting the power of the binomial; you will therefore never come at your expression of a fluxion legitimately by such method. Hence you are driven into the fallacious way of proceeding to a certain point on the supposition of an increment, and then at once shifting your supposition to that of no increment. There may seem great skill in doing this at a certain point or period. Since, if this second supposition had been made before the common division by o, all had vanished at once, and you must have got nothing by your supposition. Whereas, by this artifice of first dividing and then changing your supposition, you retain 1 and nx^{n-1}. But, notwithstanding all this address to cover it, the fallacy is still the same. For, whether it be done sooner or later, when once the second supposition or assumption is made, in the same instant the former assumption and all that you got by it is destroyed, and goes out together. And this is universally true, be the subject what it will, throughout all the branches of human knowledge;

in any other of which, I believe, men would hardly admit such a reasoning as this, which in mathematics is accepted for demonstration.

17. It may not be amiss to observe that the method for finding the fluxion of a rectangle of two flowing quantities, as it is set forth in the Treatise of Quadratures, differs from the above-mentioned taken from the second book of the Principles, and is in effect the same with that used in the *calculus differentialis*[6]. For the supposing a quantity infinitely diminished, and therefore rejecting it, is in effect the rejecting an infinitesimal; and indeed it requires a marvellous sharpness of discernment to be able to distinguish between evanescent increments and infinitesimal differences. It may perhaps be said that the quantity being infinitely diminished becomes nothing, and so nothing is rejected. But, according to the received principles, it is evident that no geometrical quantity can by any division or subdivision whatsoever be exhausted, or reduced to nothing. Considering the various arts and devices used by the great author of the fluxionary method; in how many lights he placeth his fluxions; and in what different ways he attempts to demonstrate the same point; one would be inclined to think, he was himself suspicious of the justness of his own demonstrations, and that he was not enough pleased with any notion steadily to adhere to it. Thus much at least is plain, that he owned himself satisfied concerning certain points which nevertheless he would not undertake to demonstrate to others[7]. Whether this satisfaction arose from tentative methods or inductions, which have often been admitted by mathematicians (for instance, by Dr. Wallis, in his Arithmetic of Infinites), is what I shall not pretend to determine. But, whatever the case might have been with respect to the author, it appears that his followers have shown themselves more eager in applying his method, than accurate in examining his principles.

18. It is curious to observe what subtlety and skill this great genius employs to struggle with an insuperable difficulty; and through what labyrinths he endeavours to escape the doctrine of infinitesimals; which as it intrudes upon him whether he will or no, so it is admitted and embraced by others without the least

[6] [*Analyse des Infiniment Petits*, Part I. prop. 2.]—Author. The Newton of the *Quadratura* (1704) differs from the Newton of the *Principia* (1687).

[7] [See *Letter* to Collins, Nov. 8, 1676.] —Author. John Collins, the mathematician, born 1624, died 1683.

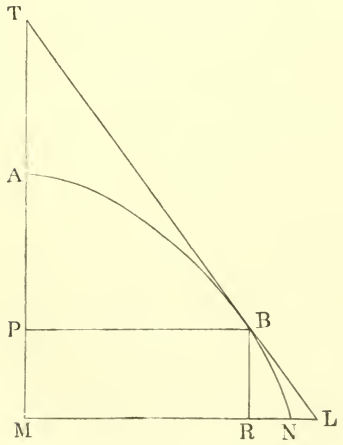
repugnance;—Leibnitz and his followers in their *calculus differentialis* making no manner of scruple, first to suppose, and secondly to reject, quantities infinitely small; with what clearness in the apprehension and justness in the reasoning, any thinking man, who is not prejudiced in favour of those things, may easily discern. The notion or idea of an *infinitesimal quantity*, as it is an object simply apprehended by the mind, hath been already considered[8]. I shall now only observe as to the method of getting rid of such quantities, that it is done without the least ceremony. As in fluxions the point of first importance, and which paves the way to the rest, is to find the fluxion of a product of two indeterminate quantities, so in the *calculus differentialis* (which method is supposed to have been borrowed from the former with some small alterations) the main point is to obtain the difference of such product. Now the rule for this is got by rejecting the product or rectangle of the differences. And in general it is supposed that no quantity is bigger or lesser for the addition or subduction of its infinitesimal: and that consequently no error can arise from such rejection of infinitesimals.

19. And yet it should seem that, whatever errors are admitted in the premises, proportional errors ought to be apprehended in the conclusion, be they finite or infinitesimal: and that therefore the ἀκρίβεια of geometry requires nothing should be neglected or rejected. In answer to this you will perhaps say, that the conclusions are accurately true, and that therefore the principles and methods from whence they are derived must be so too. But this inverted way of demonstrating your principles by your conclusions, as it would be peculiar to you gentlemen, so it is contrary to the rules of logic. The truth of the conclusion will not prove either the form or the matter of a syllogism to be true; inasmuch as the illation might have been wrong or the premises false, and the conclusion nevertheless true, though not in virtue of such illation or of such premises. I say that in every other science men prove their conclusions by their principles, and not their principles by the conclusions. But if in yours you should allow yourselves this unnatural way of proceeding, the consequence would be that you must take up with Induction, and bid adieu to Demonstration. And if you submit to this, your authority will no longer lead the way in points of Reason and Science.

[8] [Sect. 5 and 6.]—Author.

20. I have no controversy about your conclusions, but only about your logic and method: how you demonstrate? what objects you are conversant with, and whether you conceive them clearly? what principles you proceed upon; how sound they may be; and how you apply them? It must be remembered that I am not concerned about the truth of your theorems, but only about the way of coming at them; whether it be legitimate or illegitimate, clear or obscure, scientific or tentative. To prevent all possibility of your mistaking me, I beg leave to repeat and insist, that I consider the geometrical analyst as a logician, *i.e.* so far forth as he reasons and argues; and his mathematical conclusions, not in themselves, but in their premises; not as true or false, useful or insignificant, but as derived from such principles, and by such inferences. And, forasmuch as it may perhaps seem an unaccountable paradox that mathematicians should deduce true propositions from false principles, be right in the conclusion and yet err in the premises; I shall endeavour particularly to explain why this may come to pass, and show how error may bring forth truth, though it cannot bring forth science.

21. In order therefore to clear up this point, we will suppose for instance that a tangent is to be drawn to a parabola, and examine the progress of this affair as it is performed by infinitesimal differences. Let AB be a curve, the abscisse $AP = x$, the ordinate $PB = y$, the difference of the abscisse $PM = dx$, the difference of the ordinate $RN = dy$. Now, by supposing the curve to be a polygon, and consequently BN, the increment or difference of the curve, to be a straight line coincident with the tangent, and the differential triangle BRN to be similar to the triangle TPB, the subtangent PT is found a fourth proportional to $RN : RB : PB$: that is, to $dy : dx : y$. Hence the subtangent will be $\frac{y\,dx}{dy}$. But herein there is an



error arising from the forementioned false supposition, whence the value of *PT* comes out greater than the truth: for in reality it is not the triangle *RNB* but *RLB* which is similar to *PBT*, and therefore (instead of *RN*) *RL* should have been the first term of the proportion, *i.e.* $RN + NL$, *i.e.* $dy + z$: whence the true expression for the subtangent should have been $\frac{y\,dx}{dy+z}$. There was therefore an error of defect in making dy the divisor; which error was equal to z, *i.e.* *NL* the line comprehended between the curve and the tangent. Now by the nature of the curve $yy = px$, supposing p to be the parameter, whence by the rule of differences $2y\,dy = p\,dx$ and $dy = \frac{p\,dx}{2y}$. But if you multiply $y + dy$ by itself, and retain the whole product without rejecting the square of the difference, it will then come out, by substituting the augmented quantities in the equation of the curve, that $dy = \frac{p\,dx}{2y} - \frac{dy\,dy}{2y}$ truly. There was therefore an error of excess in making $dy = \frac{p\,dx}{2y}$, which followed from the erroneous rule of differences. And the measure of this second error is $\frac{dy\,dy}{2y} = z$. Therefore the two errors being equal and contrary destroy each other; the first error of defect being corrected by a second error of excess.

22. If you had committed only one error, you would not have come at a true solution of the problem. But by virtue of a twofold mistake you arrive, though not at science, yet at truth. For science it cannot be called, when you proceed blindfold, and arrive at the truth not knowing how or by what means. To demonstrate that z is equal to $\frac{dy\,dy}{2y}$, let *BR* or dx be m, and *RN* or dy be n. By the thirty-third proposition of the first book of the Conics of Apollonius, and from similar triangles, as $2x$ to y so is m to $n + z = \frac{my}{2x}$. Likewise from the nature of the parabola $yy + 2yn + nn = xp + mp$, and $2yn + nn = mp$: wherefore $\frac{2yn+nn}{p} = m$:

and because $yy = px$, $\frac{yy}{p}$ will be equal to x. Therefore substituting these values instead of m and x we shall have

$$n + z = \frac{my}{2x} = \frac{2yynp + ynnp}{2yyp}:$$

i. e. $$n + z = \frac{2yn + nn}{2y}:$$

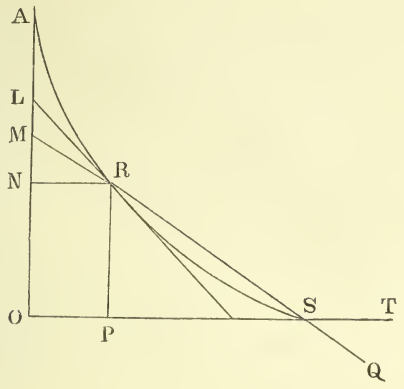
which being reduced gives

$$z = \frac{nn}{2y} = \frac{dy\,dy}{2y}$$ Q.E.D.

23. Now, I observe, in the first place, that the conclusion comes out right, not because the rejected square of dy was infinitely small, but because this error was compensated by another contrary and equal error. I observe, in the second place, that whatever is rejected, be it ever so small, if it be real, and consequently makes a real error in the premises, it will produce a proportional real error in the conclusion. Your theorems therefore cannot be accurately true, nor your problems accurately solved, in virtue of premises which themselves are not accurate; it being a rule in logic that *conclusio sequitur partem debiliorem.* Therefore, I observe, in the third place, that when the conclusion is evident and the premises obscure, or the conclusion accurate and the premises inaccurate, we may safely pronounce that such conclusion is neither evident nor accurate, in virtue of those obscure inaccurate premises or principles; but in virtue of some other principles, which perhaps the demonstrator himself never knew or thought of. I observe, in the last place, that in case the differences are supposed finite quantities ever so great, the conclusion will nevertheless come out the same: inasmuch as the rejected quantities are legitimately thrown out, not for their smallness, but for another reason, to wit, because of contrary errors, which, destroying each other, do, upon the whole, cause that nothing is really, though something is apparently, thrown out. And this reason holds equally with respect to quantities finite as well as infinitesimal, great as well as small, a foot or a yard long as well as the minutest increment.

24. For the fuller illustration of this point, I shall consider it in another light, and proceeding in finite quantities to the conclusion, I shall only then make use of one infinitesimal. Suppose

the straight line $M\mathcal{Q}$ cuts the curve AT in the points R and S.



Suppose LR a tangent at the point R, AN the abscisse, NR and OS ordinates. Let AN be produced to O, and RP be drawn parallel to NO. Suppose $AN = x$, $NR = y$, $NO = v$, $PS = z$, the subsecant $MN = s$. Let the equation $y = xx$ express the nature of the curve: and supposing y and x increased by their finite increments we get $y + z = xx + 2xv + vv$: whence the former equation being subducted, there remains $z = 2xv + vv$. And by reason of similar triangles

$$PS : PR :: NR : NM, \text{ i.e. } z : v :: y : s = \frac{vy}{z},$$

wherein if for y and z we substitute their values, we get

$$\frac{vxx}{2xv + vv} = s = \frac{xx}{2x + v}.$$

And supposing NO to be infinitely diminished, the subsecant NM will in that case coincide with the subtangent NL, and v as an infinitesimal may be rejected, whence it follows that

$$s = NL = \frac{xx}{2x} = \frac{x}{2}:$$

which is the true value of the subtangent. And, since this was obtained by one only error, *i.e.* by once ejecting one only infinitesimal, it should seem, contrary to what hath been said, that an infinitesimal quantity or difference may be neglected or thrown away, and the conclusion nevertheless be accurately true, although there was no double mistake or rectifying of one error by another,

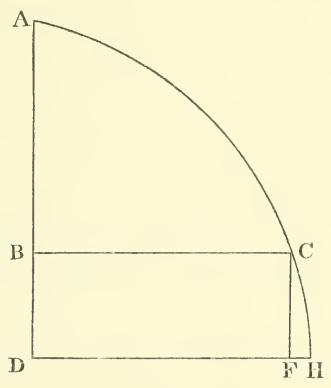
as in the first case. But, if this point be thoroughly considered, we shall find there is even here a double mistake, and that one compensates or rectifies the other. For, in the first place, it was supposed that when *NO* is infinitely diminished or becomes an infinitesimal then the subsecant *NM* becomes equal to the subtangent *NL*. But this is a plain mistake; for it is evident that as a secant cannot be a tangent, so a subsecant cannot be a subtangent. Be the difference ever so small, yet still there is a difference. And, if *NO* be infinitely small, there will even then be an infinitely small difference between *NM* and *NL*. Therefore *NM* or *S* was too little for your supposition (when you supposed it equal to *NL*); and this error was compensated by a second error in throwing out v, which last error made s bigger than its true value, and in lieu thereof gave the value of the subtangent. This is the true state of the case, however it may be disguised. And to this in reality it amounts, and is at bottom the same thing, if we should pretend to find the subtangent by having first found, from the equation of the curve and similar triangles, a general expression for all subsecants, and then reducing the subtangent under this general rule, by considering it as the subsecant when v vanishes or becomes nothing.

25. Upon the whole I observe, First, that v can never be nothing, so long as there is a secant. Secondly, that the same line cannot be both tangent and secant. Thirdly, that when v or *NO*[9] vanisheth, *PS* and *SR* do also vanish, and with them the proportionality of the similar triangles. Consequently the whole expression, which was obtained by means thereof and grounded thereupon, vanisheth when v vanisheth. Fourthly, that the method for finding secants or the expression of secants, be it ever so general, cannot in common sense extend any farther than to all secants whatsoever: and, as it necessarily supposed similar triangles, it cannot be supposed to take place where there are not similar triangles. Fifthly, that the subsecant will always be less than the subtangent, and can never coincide with it; which coincidence to suppose would be absurd; for it would be supposing the same line at the same time to cut and not to cut another given line; which is a manifest contradiction, such as

[9] [See the foregoing figure.]—Author.

subverts the hypothesis and gives a demonstration of its falsehood. Sixthly, if this be not admitted, I demand a reason why any other apagogical demonstration, or demonstration *ad absurdum* should be admitted in geometry rather than this: or that some real difference be assigned between this and others as such. Seventhly, I observe that it is sophistical to suppose *NO* or *RP*, *PS*, and *SR* to be finite real lines in order to form the triangle, *RPS*, in order to obtain proportions by similar triangles; and afterwards to suppose there are no such lines, nor consequently similar triangles, and nevertheless to retain the consequence of the first supposition, after such supposition hath been destroyed by a contrary one. Eighthly, that although, in the present case, by inconsistent suppositions truth may be obtained, yet such truth is not demonstrated: that such method is not conformable to the rules of logic and right reason: that, however useful it may be, it must be considered only as a presumption, as a knack, an art, rather an artifice, but not a scientific demonstration.

26. The doctrine premised may be farther illustrated by the following simple and easy case, wherein I shall proceed by evanescent increments. Suppose $AB = x$, $BC = y$, $BD = o$, and that xx is equal to the area ABC: it is proposed to find the ordinate y or BC. When x by flowing becomes $x + o$, then xx becomes $xx + 2xo + oo$: and the area ABC becomes ADH, and the increment of xx will be equal to $BDHC$, the increment of the area, *i.e.* to $BCFD + CFH$. And if we suppose the curvilinear space CFH to be qoo, then $2xo + oo = yo + qoo$, which divided by o gives $2xo = y + qo$. And, supposing o to vanish, $2x = y$, in which case ACH will be a straight line, and the areas ABC, CFH triangles.—Now with regard to this reasoning, it hath been already remarked[10], that it is not legitimate or logical to suppose o to vanish, *i.e.* to be nothing, *i.e.* that



[10] [Sect. 12 and 13 supra.]—Author.

there is no increment, unless we reject at the same time with the increment itself every consequence of such increment, *i. e.* whatsoever could not be obtained by supposing such increment. It must nevertheless be acknowledged that the problem is rightly solved, and the conclusion true, to which we are led by this method. It will therefore be asked, how comes it to pass that the throwing out o is attended with no error in the conclusion? I answer, the true reason hereof is plainly this: because q being unit, qo is equal to o: and therefore

$$2x + o - qo = y = 2x,$$

the equal quantities qo and o being destroyed by contrary signs.

27. As, on the one hand, it were absurd to get rid of o by saying, Let me contradict myself; let me subvert my own hypothesis; let me take it for granted that there is no increment, at the same time that I retain a quantity which I could never have got at but by assuming an increment: so, on the other hand, it would be equally wrong to imagine that in a geometrical demonstration we may be allowed to admit any error, though ever so small, or that it is possible, in the nature of things, an accurate conclusion should be derived from inaccurate principles. Therefore o cannot be thrown out as an infinitesimal, or upon the principle that infinitesimals may be safely neglected; but only because it is destroyed by an equal quantity with a negative sign, whence $o - po$ is equal to nothing. And as it is illegitimate to reduce an equation, by subducting from one side a quantity when it is not to be destroyed, or when an equal quantity is not subducted from the other side of the equation: so it must be allowed a very logical and just method of arguing to conclude that if from equals either nothing or equal quantities are subducted they shall still remain equal. And this is a true reason why no error is at last produced by the rejecting of o. Which therefore must not be ascribed to the doctrine of differences, or infinitesimals, or evanescent quantities, or momentums, or fluxions.

28. Suppose the case to be general, and that x^n is equal to the area ABC, whence by the method of fluxions the ordinate is found nx^{n-1}, which we admit for true, and shall inquire how it is arrived at. Now if we are content to come at the conclusion in a summary way, by supposing that the ratio of the fluxions of x and x^n

is found[11] to be 1 and nx^{n-1}, and that the ordinate of the area is considered as its fluxion, we shall not so clearly see our way, or perceive how the truth comes out—that method as we have shewed before being obscure and illogical. But if we fairly delineate the area and its increment, and divide the latter into two parts *BCFD* and *CFH*[12], and proceed regularly by equations between the algebraical and geometrical quantities, the reason of the thing will plainly appear. For, as x^n is equal to the area *ABC*, so is the increment of x^n equal to the increment of the area, *i. e.* to *BDHC*; that is to say

$$nox^{n-1} + \frac{nn-n}{2} oox^{n-2} + \&c. = BDFC + CFH.$$

And only the first members on each side of the equation being retained, $nox^{n-1} = BDFC$: and dividing both sides by o or *BD*, we shall get $nx^{n-1} = BC$. Admitting therefore that the curvilinear space *CFH* is equal to the rejectaneous quantity

$$\frac{nn-n}{2} oox^{n-2} + \&c.,$$

and that when this is rejected on one side, that is rejected on the other, the reasoning becomes just and the conclusion true. And it is all one whatever magnitude you allow to *BD*, whether that of an infinitesimal difference or a finite increment ever so great. It is therefore plain that the supposing the rejectaneous algebraical quantity to be an infinitely small or evanescent quantity, and therefore to be neglected, must have produced an error, had it not been for the curvilinear spaces being equal thereto, and at the same time subducted from the other part or side of the equation, agreeably to the axiom, *If from equals you subduct equals, the remainders will be equal.* For those quantities which by the analysts are said to be neglected, or made to vanish, are in reality subducted. If therefore the conclusion be true, it is absolutely necessary that the finite space *CFH* be equal to the remainder of the increment expressed by

$$\frac{nn-n}{2} oox^{n-2} \&c.;$$

equal, I say, to the finite remainder of a finite increment.

29. Therefore, be the power what you please, there will arise on one side an algebraical expression, on the other a geometrical

[11] [Sect. 13.]—Author. [12] [See the figure in sect. 26.]—Author.

quantity, each of which naturally divides itself into three members. The algebraical or fluxionary expression, into one which includes neither the expression of the increment of the absciss nor of any power thereof; another which includes the expression of the increment itself; and the third including the expression of the powers of the increment. The geometrical quantity also or whole increased area consists of three parts or members—the first of which is the given area; the second a rectangle under the ordinate and the increment of the absciss; and the third a curvilinear space. And, comparing the homologous or correspondent members on both sides, we find that as the first member of the expression is the expression of the given area, so the second member of the expression will express the rectangle or second member of the geometrical quantity, and the third, containing the powers of the increment, will express the curvilinear space, or third member of the geometrical quantity. This hint may perhaps be further extended, and applied to good purpose, by those who have leisure and curiosity for such matters. The use I make of it is to shew, that the analysis cannot obtain in augments or differences, but it must also obtain in finite quantities, be they ever so great, as was before observed.

30. It seems therefore, upon the whole, that we may safely pronounce the conclusion cannot be right, if in order thereto any quantity be made to vanish, or be neglected—except that either one error is redressed by another; or that, secondly, on the same side of an equation equal quantities are destroyed by contrary signs, so that the quantity we mean to reject is first annihilated; or, lastly, that from the opposite sides equal quantities are subducted. And therefore to get rid of quantities by the received principles of fluxions or of differences is neither good geometry nor good logic. When the augments vanish, the velocities also vanish. The velocities or fluxions are said to be *primo* and *ultimo*, as the augments nascent and evanescent. Take therefore the *ratio* of the evanescent quantities, it is the same with that of the fluxions. It will therefore answer all intents as well. Why then are fluxions introduced? Is it not to shun or rather to palliate the use of quantities infinitely small? But we have no notion whereby to conceive and measure various degrees of velocity besides space and time; or, when the times are given, besides

space alone. We have even no notion of velocity prescinded from time and space. When therefore a point is supposed to move in given times, we have no notion of greater or lesser velocities, or of proportions between velocities, but only of longer or shorter lines, and of proportions between such lines generated in equal parts of time.

31. A point may be the limit of a line: a line may be the limit of a surface: a moment may terminate time. But how can we conceive a velocity by the help of such limits? It necessarily implies both time and space, and cannot be conceived without them. And if the velocities of nascent and evanescent quantities, *i.e.* abstracted from time and space, may not be comprehended, how can we comprehend and demonstrate their proportions; or consider their *rationes primæ* and *ultimæ?* For, to consider the proportion or *ratio* of things implies that such things have magnitude; that such their magnitudes may be measured, and their relations to each other known. But, as there is no measure of velocity except time and space, the proportion of velocities being only compounded of the direct proportion of the spaces, and the reciprocal proportion of the times; doth it not follow that to talk of investigating, obtaining, and considering the proportions of velocities, exclusively of time and space, is to talk unintelligibly?

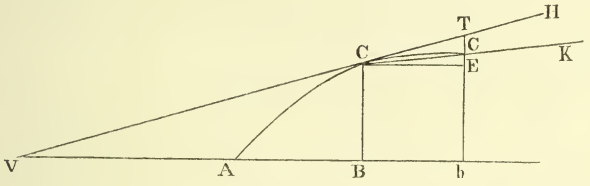
32. But you will say that, in the use and application of fluxions, men do not overstrain their faculties to a precise conception of the above-mentioned velocities, increments, infinitesimals, or any other such-like ideas of a nature so nice, subtle, and evanescent. And therefore you will perhaps maintain that problems may be solved without those inconceivable suppositions; and that, consequently, the doctrine of fluxions, as to the practical part, stands clear of all such difficulties. I answer that if in the use or application of this method those difficult and obscure points are not attended to, they are nevertheless supposed. They are the foundations on which the moderns build the principles on which they proceed, in solving problems and discovering theorems. It is with the method of fluxions as with all other methods, which presuppose their respective principles and are grounded thereon; although the rules may be practised by men who neither attend to, nor perhaps know the principles. In like

manner, therefore, as a sailor may practically apply certain rules derived from astronomy and geometry, the principles whereof he doth not understand; and as any ordinary man may solve divers numerical questions, by the vulgar rules and operations of arithmetic, which he performs and applies without knowing the reasons of them: even so it cannot be denied that you may apply the rules of the fluxionary method: you may compare and reduce particular cases to general forms: you may operate and compute and solve problems thereby, not only without an actual attention to, or an actual knowledge of, the grounds of that method, and the principles whereon it depends, and whence it is deduced, but even without having ever considered or comprehended them.

33. But then it must be remembered that in such case, although you may pass for an artist, computist, or analyst, yet you may not be justly esteemed a man of science and demonstration. Nor should any man, in virtue of being conversant in such obscure analytics, imagine his rational faculties to be more improved than those of other men which have been exercised in a different manner and on different subjects; much less erect himself into a judge and an oracle concerning matters that have no sort of connexion with or dependence on those species, symbols, or signs, in the management whereof he is so conversant and expert. As you, who are a skilful computist or analyst, may not therefore be deemed skilful in anatomy; or *vice versa*, as a man who can dissect with art may, nevertheless, be ignorant in your art of computing: even so you may both, notwithstanding your peculiar skill in your respective arts, be alike unqualified to decide upon logic, or metaphysics, or ethics, or religion. And this would be true, even admitting that you understood your own principles and could demonstrate them.

34. If it is said that fluxions may be expounded or expressed by finite lines proportional to them; which finite lines, as they may be distinctly conceived and known and reasoned upon, so they may be substituted for the fluxions, and their mutual relations or proportions be considered as the proportions of fluxions—by which means the doctrine becomes clear and useful: I answer that if, in order to arrive at these finite lines proportional to the fluxions, there be certain steps made use of

which are obscure and inconceivable, be those finite lines themselves ever so clearly conceived, it must nevertheless be acknowledged that your proceeding is not clear nor your method scientific. For instance, it is supposed that *AB* being the absciss,



BC the ordinate, and *VCH* a tangent of the curve *AC*, *Bb* or *CE* the increment of the absciss, *Ec* the increment of the ordinate, which produced meets *VH* in the point *T* and *Cc* the increment of the curve. The right line *Cc* being produced to *K*, there are formed three small triangles, the rectilinear *CEc*, the mixtilinear *CEc*, and the rectilinear triangle *CET*. It is evident these three triangles are different from each other, the rectilinear *CEc* being less than the mixtilinear *CEc*, whose sides are the three increments above mentioned, and this still less than the triangle *CET*. It is supposed that the ordinate *bc* moves into the place *BC*, so that the point *c* is coincident with the point *C*; and the right line *CK*, and consequently the curve *Cc*, is coincident with the tangent *CH*. In which case the mixtilinear evanescent triangle *CEc* will, in its last form, be similar to the triangle *CET*: and its evanescent sides *CE*, *Ec*, and *Cc*, will be proportional to *CE*, *ET*, and *CT*, the sides of the triangle *CET*. And therefore it is concluded that the fluxions of the lines *AB*, *BC*, and *AC*, being in the last ratio of their evanescent increments, are proportional to the sides of the triangle *CET*, or, which is all one, of the triangle *VBC* similar thereunto [13]. It is particularly remarked and insisted on by the great author, that the points *C* and *c* must not be distant one from another, by any the least interval whatsoever: but that, in order to find the ultimate proportions of the lines *CE*, *Ec*, and *Cc* (*i. e.* the

[13] [*Introd. ad Quadraturam Curvarum.*]—Author.

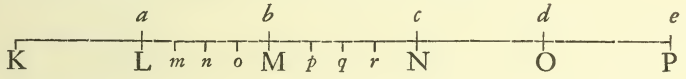
proportions of the fluxions or velocities) expressed by the finite sides of the triangle *VBC*, the points *C* and *c* must be accurately coincident, *i.e.* one and the same. A point therefore is considered as a triangle, or a triangle is supposed to be formed in a point. Which to conceive seems quite impossible. Yet some there are who, though they shrink at all other mysteries, make no difficulty of their own, who strain at a gnat and swallow a camel.

35. I know not whether it be worth while to observe, that possibly some men may hope to operate by symbols and suppositions, in such sort as to avoid the use of fluxions, momentums, and infinitesimals, after the following manner. Suppose x to be an absciss of a curve, and z another absciss of the same curve. Suppose also that the respective areas are xxx and zzz: and that $z-x$ is the increment of the absciss, and $zzz-xxx$ the increment of the area, without considering how great or how small those increments may be. Divide now $zzz-xxx$ by $z-x$, and the quotient will be $zz+zx+xx$: and, supposing that z and x are equal, the same quotient will be $3xx$, which in that case is the ordinate, which therefore may be thus obtained independently of fluxions and infinitesimals. But herein is a direct fallacy: for, in the first place, it is supposed that the abscisses z and x are unequal, without which supposition no one step could have been made; and in the second place, it is supposed they are equal; which is a manifest inconsistency, and amounts to the same thing that hath been before considered [14]. And there is indeed reason to apprehend that all attempts for setting the abstruse and fine geometry on a right foundation, and avoiding the doctrine of velocities, momentums, &c., will be found impracticable, till such time as the object and end of geometry are better understood than hitherto they seem to have been. The great author of the method of fluxions felt this difficulty, and therefore he gave in to those nice abstractions and geometrical metaphysics without which he saw nothing could be done on the received principles: and what in the way of demonstration he hath done with them the reader will judge. It must, indeed, be acknowledged that he used fluxions, like the

[14] [Sect. 15.]—Author.

scaffold of a building, as things to be laid aside or got rid of as soon as finite lines were found proportional to them. But then these finite exponents are found by the help of fluxions. Whatever therefore is got by such exponents and proportions is to be ascribed to fluxions: which must therefore be previously understood. And what are these fluxions? The velocities of evanescent increments. And what are these same evanescent increments? They are neither finite quantities, nor quantities infinitely small, nor yet nothing. May we not call them the ghosts of departed quantities?

36. Men too often impose on themselves and others as if they conceived and understood things expressed by signs, when in truth they have no idea, save only of the very signs themselves. And there are some grounds to apprehend that this may be the present case. The velocities of evanescent or nascent quantities are supposed to be expressed, both by finite lines of a determinate magnitude, and by algebraical notes or signs: but I suspect that many who, perhaps never having examined the matter take it for granted, would, upon a narrow scrutiny, find it impossible to frame any idea or notion whatsoever of those velocities, exclusive of such finite quantities and signs.



Suppose the line *KP* described by the motion of a point continually accelerated, and that in equal particles of time the unequal parts *KL*, *LM*, *MN*, *NO*, &c. are generated. Suppose also that *a*, *b*, *c*, *d*, *e*, &c. denote the velocities of the generating point, at the several periods of the parts or increments so generated. It is easy to observe that these increments are each proportional to the sum of the velocities with which it is described: that, consequently, the several sums of the velocities, generated in equal parts of time, may be set forth by the respective lines *KL*, *LM*, *MN*, &c. generated in the same times. It is likewise an easy matter to say, that the last velocity generated in the first particle of time may be expressed by the symbol *a*, the last in the second by *b*, the last generated in the third by *c*, and so on: that *a* is the velocity of *LM* in *statu nascenti*, and *b*, *c*, *d*, *e*, &c. are the velocities of the increments *MN*, *NO*,

OP, &c. in their respective nascent estates. You may proceed and consider these velocities themselves as flowing or increasing quantities, taking the velocities of the velocities, and the velocities of the velocities of the velocities, *i.e.* the first, second, third, &c. velocities *ad infinitum:* which succeeding series of velocities may be thus expressed, $a.\ b-a.\ c-2b+a.\ d-3c-3b-a$ &c., which you may call by the names of first, second, third, fourth fluxions. And for an apter expression you may denote the variable flowing line *KL, KM, KN*, &c. by the letter x; and the first fluxions by $\dot{x}$, the second by $\ddot{x}$, the third by $\dddot{x}$, and so on *ad infinitum.*

37. Nothing is easier than to assign names, signs, or expressions to these fluxions; and it is not difficult to compute and operate by means of such signs. But it will be found much more difficult to omit the signs and yet retain in our minds the things which we suppose to be signified by them. To consider the exponents, whether geometrical, or algebraical, or fluxionary, is no difficult matter. But to form a precise idea of a third velocity for instance, in itself and by itself, *Hoc opus, hic labor.* Nor indeed is it an easy point to form a clear and distinct idea of any velocity at all, exclusive of and prescinding from all length of time and space; as also from all notes, signs, or symbols whatsoever. This, if I may be allowed to judge of others by myself, is impossible. To me it seems evident that measures and signs are absolutely necessary in order to conceive or reason about velocities; and that consequently, when we think to conceive the velocities simply and in themselves, we are deluded by vain abstractions.

38. It may perhaps be thought by some an easier method of conceiving fluxions to suppose them the velocities wherewith the infinitesimal differences are generated. So that the first fluxions shall be the velocities of the first differences, the second the velocities of the second differences, the third fluxions the velocities of the third differences, and so on *ad infinitum.* But, not to mention the insurmountable difficulty of admitting or conceiving infinitesimals, and infinitesimals of infinitesimals, &c., it is evident that this notion of fluxions would not consist with the great author's view; who held that the minutest quantity ought not to be neglected, that therefore the doctrine of infinitesimal differ-

ences was not to be admitted in geometry, and who plainly appears to have introduced the use of velocities or fluxions, on purpose to exclude or do without them.

39. To others it may possibly seem that we should form a juster idea of fluxions by assuming the finite, unequal, isochronal increments *KL*, *LM*, *MN*, &c., and considering them in *statu nascenti*, also their increments in *statu nascenti*, and the nascent increments of those increments, and so on, supposing the first nascent increments to be proportional to the first fluxions or velocities, the nascent increments of those increments to be proportional to the second fluxions, the third nascent increments to be proportional to the third fluxions, and so onwards. And, as the first fluxions are the velocities of the first nascent increments, so the second fluxions may be conceived to be the velocities of the second nascent increments, rather than the velocities of velocities. By which means the analogy of fluxions may seem better preserved, and the notion rendered more intelligible.

40. And indeed it should seem that in the way of obtaining the second or third fluxion of an equation the given fluxions were considered rather as increments than velocities. But the considering them sometimes in one sense, sometimes in another, one while in themselves, another in their exponents, seems to have occasioned no small share of that confusion and obscurity which are found in the doctrine of fluxions. It may seem therefore that the notion might be still mended, and that instead of fluxions of fluxions, or fluxions of fluxions of fluxions, and instead of second, third, or fourth, &c. fluxions of a given quantity, it might be more consistent and less liable to exception to say, the fluxion of the first nascent increment, *i. e.* the second fluxion; the fluxion of the second nascent increment, *i. e.* the third fluxion; the fluxion of the third nascent increment, *i. e.* the fourth fluxion—which fluxions are conceived respectively proportional, each to the nascent principle of the increment succeeding that whereof it is the fluxion.

41. For the more distinct conception of all which it may be considered that if the finite increment *LM*[15] be divided into the isochronal parts *Lm*, *mn*, *no*, *oM*; and the increment *MN* into the parts *Mp*, *pq*, *qr*, *rN* isochronal to the former; as the whole increments *LM*, *MN* are proportional to the sums of their describing

[15] [See the foregoing scheme in sect. 36.]—Author.

velocities, even so the homologous particles *Lm*, *Mp* are also proportional to the respective accelerated velocities with which they are described. And, as the velocity with which *Mp* is generated, exceeds that with which *Lm* was generated, even so the particle *Mp* exceeds the particle *Lm*. And in general, as the isochronal velocities describing the particles of *MN* exceed the isochronal velocities describing the particles of *LM*, even so the particles of the former exceed the correspondent particles of the latter. And this will hold, be the said particles ever so small. *MN* therefore will exceed *LM* if they are both taken in their nascent states: and that excess will be proportional to the excess of the velocity *b* above the velocity *a*. Hence we may see that this last account of fluxions comes, in the upshot, to the same thing with the first[16].

42. But, notwithstanding what hath been said, it must still be acknowledged that the finite particles *Lm* or *Mp*, though taken ever so small, are not proportional to the velocities *a* and *b*; but each to a series of velocities changing every moment, or which is the same thing, to an accelerated velocity, by which it is generated during a certain minute particle of time: that the nascent beginnings or evanescent endings of finite quantities, which are produced in moments of infinitely small parts of time, are alone proportional to given velocities: that therefore, in order to conceive the first fluxions, we must conceive time divided into moments, increments generated in those moments, and velocities proportional to those increments: that, in order to conceive second and third fluxions, we must suppose that the nascent principles or momentaneous increments have themselves also other momentaneous increments, which are proportional to their respective generating velocities: that the velocities of these second momentaneous increments are second fluxions: those of their nascent momentaneous increments third fluxions. And so on *ad infinitum*.

43. By subducting the increment generated in the first moment from that generated in the second, we get the increment of an increment. And by subducting the velocity generating in the first moment from that generating in the second, we get a fluxion of a fluxion. In like manner, by subducting the difference of the velocities generating in the two first moments from the excess of the velocity in the third above that in the second moment, we obtain

[16] [See the foregoing scheme in sect. 36.]—AUTHOR.

the third fluxion. And after the same analogy we may proceed to fourth, fifth, sixth fluxions, &c. And if we call the velocities of the first, second, third, fourth moments, a, b, c, d, the series of fluxions will be as above, $a.\ b-a.\ c-2b+a.\ d-3c+3b-a.$ *ad infinitum*,

$\dot{x}.\ \ddot{x}.\ \dddot{x}.\ \ddddot{x}.$ *ad infinitum.*

44. Thus fluxions may be considered in sundry lights and shapes, which seem all equally difficult to conceive. And, indeed, as it is impossible to conceive velocity without time or space, without either finite length or finite duration[17], it must seem above the powers of men to comprehend even the first fluxions. And if the first are incomprehensible, what shall we say of the second and third fluxions, &c.? He who can conceive the beginning of a beginning, or the end of an end, somewhat before the first or after the last, may be perhaps sharpsighted enough to conceive these things. But most men will, I believe, find it impossible to understand them in any sense whatever.

45. One would think that men could not speak too exactly on so nice a subject. And yet, as was before hinted, we may often observe that the exponents of fluxions, or notes representing fluxions are compounded with the fluxions themselves. Is not this the case when, just after the fluxions of flowing quantities were said to be the celerities of their increasing, and the second fluxions to be the mutations of the first fluxions or celerities, we are told that

$\dot{z}.\ \ddot{z}.\ \dddot{z}.\ \ddddot{z}.\ \dot{\ddddot{z}}.\ \ddot{\ddddot{z}}.$[18] represents a series of quantities whereof each subsequent quantity is the fluxion of the preceding; and each foregoing is a fluent quantity having the following one for its fluxion?

46. Divers series of quantities and expressions, geometrical and algebraical, may be easily conceived, in lines, in surfaces, in species, to be continued without end or limit. But it will not be found so easy to conceive a series, either of mere velocities or of mere nascent increments, distinct therefrom and corresponding thereunto. Some perhaps may be led to think the author intended a series of ordinates, wherein each ordinate was the fluxion of the preceding and fluent of the following, *i. e.* that the fluxion of one ordinate was itself the ordinate of another curve; and the fluxion

[17] [Sect. 31.]—Author. [18] [*De Quadratura Curvarum.*]—Author.

of this last ordinate was the ordinate of yet another curve; and so on *ad infinitum*. But who can conceive how the fluxion (whether velocity or nascent increment) or an ordinate should be itself an ordinate? Of more than that each preceding quantity or fluent is related to its subsequent or fluxion, as the area of a curvilinear figure to its ordinate; agreeably to what the author remarks, that each preceding quantity in such series is as the area of a curvilinear figure, whereof the abscis is z, and the ordinate is the following quantity?

47. Upon the whole it appears that the celerities are dismissed, and instead thereof areas and ordinates are introduced. But, however expedient such analogies or such expressions may be found for facilitating the modern quadratures, yet we shall not find any light given us thereby into the original real nature of fluxions; or that we are enabled to frame from thence just ideas of fluxions considered in themselves. In all this the general ultimate drift of the author is very clear, but his principles are obscure. But perhaps those theories of the great author are not minutely considered or canvassed by his disciples; who seem eager, as was before hinted, rather to operate than to know, rather to apply his rules and his forms than to understand his principles and enter into his notions. It is nevertheless certain that, in order to follow him in his quadratures, they must find fluents from fluxions; and in order to this, they must know to find fluxions from fluents; and in order to find fluxions, they must first know what fluxions are. Otherwise they proceed without clearness and without science. Thus the direct method precedes the inverse, and the knowledge of the principles is supposed in both. But as for operating according to rules, and by the help of general forms, whereof the original principles and reasons are not understood, this is to be esteemed merely technical. Be the principles therefore ever so abstruse and metaphysical, they must be studied by whoever would comprehend the doctrine of fluxions. Nor can any geometrician have a right to apply the rules of the great author, without first considering his metaphysical notions whence they were derived. These, how necessary soever in order to science—which can never be obtained without a precise, clear, and accurate conception of the principles—are nevertheless by several carelessly passed over; while the expressions alone are

dwelt on and considered and treated with great skill and management, thence to obtain other expressions by methods suspicious and indirect (to say the least) if considered in themselves, however recommended by Induction and Authority—two motives which are acknowledged sufficient to beget a rational faith and moral persuasion, but nothing higher.

48. You may possibly hope to evade the force of all that hath been said, and to screen false principles and inconsistent reasonings, by a general pretence that these objections and remarks are *metaphysical*. But this is a vain pretence. For the plain sense and truth of what is advanced in the foregoing remarks, I appeal to the understanding of every unprejudiced intelligent reader. To the same I appeal, whether the points remarked upon are not most incomprehensible metaphysics. And metaphysics not of mine, but your own. I would not be understood to infer that your notions are false or vain because they are metaphysical. Nothing is either true or false for that reason. Whether a point be called metaphysical or no avails little. The question is, whether it be clear or obscure, right or wrong, well or ill deduced?

49. Although momentaneous increments, nascent and evanescent quantities, fluxions and infinitesimals of all degrees are in truth such shadowy entities, so difficult to imagine or conceive distinctly, that (to say the least) they cannot be admitted as principles or objects of clear and accurate science; and although this obscurity and incomprehensibility of your metaphysics had been alone sufficient to allay your pretensions to evidence; yet it hath, if I mistake not, been farther shewn, that your inferences are no more just than your conceptions are clear, and that your logics are as exceptionable as your metaphysics. It should seem, therefore, upon the whole, that your conclusions are not attained by just reasoning from clear principles: consequently, that the employment of modern analysts, however useful in mathematical calculations and constructions, doth not habituate and qualify the mind to apprehend clearly and infer justly; and, consequently, that you have no right, in virtue of such habits, to dictate out of your proper sphere, beyond which your judgment is to pass for no more than that of other men.

50. Of a long time I have suspected that these modern analytics were not scientifical, and gave some hints[19] thereof to the public about twenty-five years ago. Since which time, I have been diverted by other occupations, and imagined I might employ myself better than in deducing and laying together my thoughts on so nice a subject. And though of late I have been called upon to make good my suggestions; yet, as the person who made this call doth not appear to think maturely enough to understand either those metaphysics which he would refute, or mathematics which he would patronize, I should have spared myself the trouble of writing for his conviction. Nor should I now have troubled you or myself with this address, after so long an intermission of these studies, were it not to prevent, so far as I am able, your imposing on yourself and others in matters of much higher moment and concern. And, to the end that you may more clearly comprehend the force and design of the foregoing remarks, and pursue them still farther in your own meditations, I shall subjoin the following Queries.

Query 1. Whether the object of geometry be not the proportions of assignable extensions? And whether there be any need of considering quantities either infinitely great or infinitely small?

Qu. 2. Whether the end of geometry be not to measure assignable finite extension? And whether this practical view did not first put men on the study of geometry?

Qu. 3. Whether the mistaking the object and end of geometry hath not created needless difficulties, and wrong pursuits in that science?

Qu. 4. Whether men may properly be said to proceed in a scientific method, without clearly conceiving the object they are conversant about, the end proposed, and the method by which it is pursued?

Qu. 5. Whether it doth not suffice, that every assignable number of parts may be contained in some assignable magnitude?

[19] See *Principles of Human Knowledge*, sect. 123—134, with which, as well as with the reasonings in the same treatise against absolute and abstract space, time, and motion, and on infinity, the following Queries may be compared.

And whether it be not unnecessary, as well as absurd, to suppose that finite extension is infinitely divisible?

Qu. 6. Whether the diagrams in a geometrical demonstration are not to be considered as signs of all possible finite figures, of all sensible and imaginable extensions or magnitudes of the same kind?

Qu. 7. Whether it be possible to free geometry from insuperable difficulties and absurdities, so long as either the abstract general idea of extension, or absolute external extension be supposed its true object?

Qu. 8. Whether the notions of absolute time, absolute place, and absolute motion be not most abstractedly metaphysical? Whether it be possible for us to measure, compute, or know them?

Qu. 9. Whether mathematicians do not engage themselves in disputes and paradoxes concerning what they neither do nor can conceive? And whether the doctrine of forces be not a sufficient proof of this[20]?

Qu. 10. Whether in geometry it may not suffice to consider assignable finite magnitude, without concerning ourselves with infinity? And whether it would not be righter to measure large polygons having finite sides, instead of curves, than to suppose curves are polygons of infinitesimal sides, a supposition neither true nor conceivable?

Qu. 11. Whether many points which are not readily assented to are not nevertheless true? And whether those in the two following queries may not be of that number?

Qu. 12. Whether it be possible that we should have had an idea or notion of extension prior to motion[21]? Or whether, if a man had never perceived motion, he would ever have known or conceived one thing to be distant from another[21]?

Qu. 13. Whether geometrical quantity hath co-existent parts? And whether all quantity be not in a flux as well as time and motion?

Qu. 14. Whether extension can be supposed an attribute of a Being immutable and eternal?

Qu. 15. Whether to decline examining the principles, and un-

[20] [See a Latin treatise *De Motu*, published at London, in the year 1721.]—Author.

[21] Compare Berkeley's Theory of Vision with these two pregnant Queries, regarding the relation of the notions of motion and extension.

ravelling the methods used in mathematics would not shew a bigotry in mathematicians?

Qu. 16. Whether certain maxims do not pass current among analysts which are shocking to good sense? And whether the common assumption, that a finite quantity divided by nothing is infinite, be not of this number?

Qu. 17. Whether the considering geometrical diagrams absolutely or in themselves, rather than as representatives of all assignable magnitudes or figures of the same kind, be not a principal cause of the supposing finite extension infinitely divisible; and of all the difficulties and absurdities consequent thereupon?

Qu. 18. Whether, from geometrical propositions being general, and the lines in diagrams being therefore general substitutes or representatives, it doth not follow that we may not limit or consider the number of parts into which such particular lines are divisible?

Qu. 19. When it is said or implied, that such a certain line delineated on paper contains more than any assignable number of parts, whether any more in truth ought to be understood, than that it is a sign indifferently representing all finite lines, be they ever so great. In which relative capacity it contains, *i. e.* stands for more than any assignable number of parts? And whether it be not altogether absurd to suppose a finite line, considered in itself or in its own positive nature, should contain an infinite number of parts?

Qu. 20. Whether all arguments for the infinite divisibility of finite extension do not suppose and imply, either general abstract ideas, or absolute external extension to be the object of geometry? And, therefore, whether, along with those suppositions, such arguments also do not cease and vanish?

Qu. 21. Whether the supposed infinite divisibility of finite extension hath not been a snare to mathematicians and a thorn in their sides? And whether a quantity infinitely diminished and a quantity infinitely small are not the same thing?

Qu. 22. Whether it be necessary to consider velocities of nascent or evanescent quantities, or moments, or infinitesimals? And whether the introducing of things so inconceivable be not a reproach to mathematics?

Qu. 23. Whether inconsistencies can be truths? Whether points repugnant and absurd are to be admitted upon any subjects, or in any science? And whether the use of infinites ought to be allowed as a sufficient pretext and apology for the admitting of such points in geometry?

Qu. 24. Whether a quantity be not properly said to be known, when we know its proportion to given quantities? And whether this proportion can be known but by expressions or exponents, either geometrical, algebraical, or arithmetical? And whether expressions in lines or species can be useful but so far forth as they are reducible to numbers?

Qu. 25. Whether the finding out proper expressions or notations of quantity be not the most general character and tendency of the mathematics? And arithmetical operation that which limits and defines their use?

Qu. 26. Whether mathematicians have sufficiently considered the analogy and use of signs? And how far the specific limited nature of things corresponds thereto?

Qu. 27. Whether because, in stating a general case of pure algebra, we are at full liberty to make a character denote either a positive or a negative quantity, or nothing at all, we may therefore, in a geometrical case, limited by hypotheses and reasonings from particular properties and relations of figures, claim the same licence?

Qu. 28. Whether the shifting of the hypothesis, or (as we may call it) the *fallacia suppositionis* be not a sophism that far and wide infects the modern reasonings, both in the mechanical philosophy and in the abstruse and fine geometry?

Qu. 29. Whether we can form an idea or notion of velocity distinct from and exclusive of its measures, as we can of heat distinct from and exclusive of the degrees on the thermometer by which it is measured? And whether this be not supposed in the reasonings of modern analysts?

Qu. 30. Whether motion can be conceived in a point of space? And if motion cannot, whether velocity can? And if not, whether a first or last velocity can be conceived in a mere limit, either initial or final, of the described space?

Qu. 31. Where there are no increments, whether there can be any *ratio* of increments? Whether nothings can be considered

as proportional to real quantities? Or whether to talk of their proportions be not to talk nonsense? Also in what sense we are to understand the proportion of a surface to a line, of an area to an ordinate? And whether species or numbers, though properly expressing quantities which are not homogeneous, may yet be said to express their proportion to each other?

Qu. 32. Whether if all assignable circles may be squared, the circle is not, to all intents and purposes, squared as well as the parabola? Or whether a parabolical area can in fact be measured more accurately than a circular?

Qu. 33. Whether it would not be righter to approximate fairly than to endeavour at accuracy by sophisms?

Qu. 34. Whether it would not be more decent to proceed by trials and inductions, than to pretend to demonstrate by false principles?

Qu. 35. Whether there be not a way of arriving at truth, although the principles are not scientific, nor the reasoning just? And whether such a way ought to be called a knack or a science?

Qu. 36. Whether there can be science of the conclusion where there is not [[22]evidence] of the principles? And whether a man can have [[22]evidence] of the principles without understanding them? And therefore, whether the mathematicians of the present age act like men of science, in taking so much more pains to apply their principles than to understand them?

Qu. 37. Whether the greatest genius wrestling with false principles may not be foiled? And whether accurate quadratures can be obtained without new *postulata* or assumptions? And if not, whether those which are intelligible and consistent ought not to be preferred to the contrary? See sect. 28 and 29.

Qu. 38. Whether tedious calculations in algebra and fluxions be the likeliest method to improve the mind? And whether men's being accustomed to reason altogether about mathematical signs and figures doth not make them at a loss how to reason without them?

Qu. 39. Whether, whatever readiness analysts acquire in stating

[22] 'Evidence,' in all the collected editions of Berkeley's *Works*—'science,' in the original or 1734 edition.

a problem, or finding apt expressions for mathematical quantities, the same doth necessarily infer a proportionable ability in conceiving and expressing other matters?

Qu. 40. Whether it be not a general case or rule, that one and the same coefficient dividing equal products gives equal quotients? And yet whether such coefficient can be interpreted by o or nothing? Or whether any one will say that if the equation $2 \times o = 5 \times o$, be divided by o, the quotients on both sides are equal? Whether therefore a case may not be general with respect to all quantities and yet not extend to nothings, or include the case of nothing? And whether the bringing nothing under the notion of quantity may not have betrayed men into false reasoning?

Qu. 41. Whether in the most general reasonings about equalities and proportions men may not demonstrate as well as in geometry? Whether in such demonstrations they are not obliged to the same strict reasoning as in geometry? And whether such their reasonings are not deduced from the same axioms with those in geometry? Whether therefore algebra be not as truly a science as geometry?

Qu. 42. Whether men may not reason in species as well as in words? Whether the same rules of logic do not obtain in both cases? And whether we have not a right to expect and demand the same evidence in both?

Qu. 43. Whether an algebraist, fluxionist, geometrician, or demonstrator of any kind can expect indulgence for obscure principles or incorrect reasonings? And whether an algebraical note or species can at the end of a process be interpreted in a sense which could not have been substituted for it at the beginning? Or whether any particular supposition can come under a general case which doth not consist with the reasoning thereof?

Qu. 44. Whether the difference between a mere computer and a man of science be not, that the one computes on principles clearly conceived, and by rules evidently demonstrated, whereas the other doth not?

Qu. 45. Whether, although geometry be a science, and algebra allowed to be a science, and the analytical a most excellent method, in the application, nevertheless, of the analysis to

geometry, men may not have admitted false principles and wrong methods of reasoning?

Qu. 46. Whether, although algebraical reasonings are admitted to be ever so just, when confined to signs or species as general representatives of quantity, you may not nevertheless fall into error, if, when you limit them to stand for particular things, you do not limit yourself to reason consistently with the nature of such particular things? And whether such error ought to be imputed to pure algebra?

Qu. 47. Whether the view of modern mathematicians doth not rather seem to be the coming at an expression by artifice, than the coming at science by demonstration?

Qu. 48. Whether there may not be sound metaphysics as well as unsound? Sound as well as unsound logic? And whether the modern analytics may not be brought under one of these denominations, and which?

Qu. 49. Whether there be not really a *philosophia prima*, a certain transcendental science superior to and more extensive than mathematics, which it might behove our modern analysts rather to learn than despise?

Qu. 50. Whether, ever since the recovery of mathematical learning, there have not been perpetual disputes and controversies among the mathematicians? And whether this doth not disparage the evidence of their methods?

Qu. 51. Whether anything but metaphysics and logic can open the eyes of mathematicians and extricate them out of their difficulties?

Qu. 52. Whether, upon the received principles, a quantity can by any division or subdivision, though carried ever so far, be reduced to nothing?

Qu. 53. Whether, if the end of geometry be practice, and this practice be measuring, and we measure only assignable extensions, it will not follow that unlimited approximations completely answer the intention of geometry?

Qu. 54. Whether the same things which are now done by infinites may not be done by finite quantities? And whether this would not be a great relief to the imaginations and understandings of mathematical men?

Qu. 55. Whether those philomathematical physicians, anato-

mists, and dealers in the animal economy, who admit the doctrine of fluxions with an implicit faith, can with a good grace insult other men for believing what they do not comprehend?

Qu. 56. Whether the corpuscularian, experimental, and mathematical philosophy, so much cultivated in the last age, hath not too much engrossed men's attention; some part whereof it might have usefully employed?

Qu. 57. Whether, from this and other concurring causes, the minds of speculative men have not been borne downward, to the debasing and stupifying of the higher faculties? And whether we may not hence account for that prevailing narrowness and bigotry among many who pass for men of science, their incapacity for things moral, intellectual, or theological, their proneness to measure all truths by sense and experience of animal life?

Qu. 58. Whether it be really an effect of thinking, that the same men admire the great author for his fluxions, and deride him for his religion?

Qu. 59. If certain philosophical virtuosi of the present age have no religion, whether it can be said to be want of faith?

Qu. 60. Whether it be not a juster way of reasoning, to recommend points of faith from their effects, than to demonstrate mathematical principles by their conclusions?

Qu. 61. Whether it be not less exceptionable to admit points above reason than contrary to reason?

Qu. 62. Whether mysteries may not with better right be allowed of in Divine Faith than in human science?

Qu. 63. Whether such mathematicians as cry out against mysteries have ever examined their own principles?

Qu. 64. Whether mathematicians, who are so delicate in religious points, are strictly scrupulous in their own science? Whether they do not submit to authority, take things upon trust, and believe points inconceivable? Whether they have not their mysteries, and what is more, their repugnances and contradictions?

Qu. 65. Whether it might not become men who are puzzled and perplexed about their own principles, to judge warily, candidly, and modestly concerning other matters?

Qu. 66. Whether the modern analytics do not furnish a strong *argumentum ad hominem* against the philomathematical infidels of these times?

Qu. 67. Whether it follows from the above-mentioned remarks, that accurate and just reasoning is the peculiar character of the present age? And whether the modern growth of infidelity can be ascribed to a distinction so truly valuable?

A DEFENCE

OF

FREE-THINKING IN MATHEMATICS.

IN ANSWER TO

A PAMPHLET OF PHILALETHES CANTABRIGIENSIS,

ENTITLED,

GEOMETRY NO FRIEND TO INFIDELITY,

OR A DEFENCE OF SIR ISAAC NEWTON, AND THE BRITISH MATHEMATICIANS.

ALSO

AN APPENDIX CONCERNING

MR. WALTON'S VINDICATION OF THE PRINCIPLES OF FLUXIONS AGAINST THE OBJECTIONS CONTAINED IN THE ANALYST.

WHEREIN IT IS ATTEMPTED TO PUT THIS CONTROVERSY IN SUCH A LIGHT AS THAT EVERY READER MAY BE ABLE TO JUDGE THEREOF.

——— '*Veritas odium parit.*'—TER. *And.* I. i. 41.

Ἐπεὶ δὲ ὁ Μαθηματικὸς χρῆται τοῖς Κοινοῖς ἰδίως, καὶ τὰς τούτων ἀρχὰς ἂν εἴη θεωρῆσαι τῆς Πρώτης Φιλοσοφίας.—ARIST. *Metaph.* Lib. X. cap. 4. edit. Bekker, A.D. 1837. Vol. VIII. p. 203.

1735.

A DEFENCE

OF

FREE-THINKING IN MATHEMATICS[1].

1. When I read your *Defence of the British Mathematicians*, I could not, Sir, but admire your courage in asserting with such undoubting assurance things so easily disproved. This to me

[1] This *Defence*, published in London in March, 1735 (printed for I. Tonson), is Berkeley's reply to the celebrated attack on the *Analyst*, by Dr. Jurin, under the name of *Philalethes Cantabrigiensis*, in his *Geometry no Friend to Infidelity; or a Defence of Sir Isaac Newton and the British Mathematicians. In a Letter to the Author of the Analyst.* This first tract of Jurin appeared in May, 1734. In the following year, there was a rejoinder to Berkeley's *Defence*, by *Philalethes*, entitled *The Minute Mathematician: or the Free-thinker no Just Thinker, set forth in a Second Letter to the Author of the Analyst, containing a Defence of Sir Isaac Newton and the British Mathematicians against a late Pamphlet entitled 'A Defence of Free-thinking in Mathematics.'* To this letter, dated June 13, 1735, and published in the following month, Berkeley made no reply.

Early in 1735, Mr. Walton's (of Dublin) *Vindication of Sir Isaac Newton's Fluxions*, and his *Catechism of the Author of the Minute Philosopher fully answered* appeared. To the former of these Berkeley replied in the Appendix to the following *Defence* (see pp. 333–336); and to the latter in his third tract in the *Analyst* controversy—*Reasons for not replying to Mr. Walton's Full Answer* (see pp. 337–350). Mr. Walton rejoined in an *Answer to the Reasons for not replying to Mr. Walton's Full Answer*, contained in an Appendix to the second edition of his *Catechism*. With this the controversy between Berkeley and Walton ended.

The following pamphlets and articles also belong to the *Analyst* controversy:—

A Discourse concerning the Nature and Certainty of Sir Isaac Newton's Methods of Fluxions, and of Prime and Ultimate Ratios. By Benjamin Robins, F.R.S. This *Discourse* was published in September, 1735. It was reviewed in the *Republic of Letters* of the following month. In the December number of that work, in the same year, there is a review by Robins himself of the 'objections,' in the preceding critique, 'to the doctrine of fluxions and ultimate proportions; with remarks on the methods taken to obviate them.' The controversy was continued in the form of a series of articles between Robins and *Philalethes Cantabrigiensis*, which appeared in the *Republic of Letters* in January, April, July, and August, 1736. Dr. Pemberton also appeared as a party in the controversy. A series of nine articles and rejoinders between Pemberton and Jurin is to be found in the *Works of the Learned*, in the successive months from February till October, 1737.

In 1736, the Rev Thomas Bayes published an *Introduction to the Doctrine of Fluxions, and Defence of the Mathematicians against the Objections of the Author of the Analyst, so far as they are designed to affect the General Methods of Reasoning.* In the following year Mr. James Smith produced *A new Treatise on Fluxions.* A short anonymous *Explanation of Fluxions* was published in 1741. In 1745 appeared *The Harmony of the Ancient and Modern Geometry asserted: in answer to the Call of the Author*

seemed unaccountable, till I reflected on what you say (p. 32,) when, upon my having appealed to every thinking reader, whether it be possible to frame any clear conception of Fluxions, you express yourself in the following manner—'Pray, Sir, who are those thinking readers you appeal to? Are they geometricians, or persons wholly ignorant of geometry? If the former, I leave it to them: if the latter, I ask, How well are they qualified to judge of the method of fluxions?' It must be acknowledged you seem by this dilemma secure in the favour of one part of your readers, and the ignorance of the other. I am nevertheless persuaded there are fair and candid men among the mathematicians. And for those who are not mathematicians, I shall endeavour so to unveil this mystery, and put the controversy between us in such a light as that every reader of ordinary sense and reflection may be a competent judge thereof.

2. You express an extreme surprise and concern, 'that I should take so much pains to depreciate one of the noblest sciences, to disparage and traduce a set of learned men, whose labours so greatly conduce to the honour of this island (p. 5); to lessen the reputation and authority of Sir Isaac Newton and his followers, by shewing that they are not such masters of reason as they are generally presumed to be; and to depreciate the science they profess, by demonstrating to the world that it is not of that clearness and certainty as is commonly imagined.' All which, you insist, 'appears very strange to you and the rest of that famous University, who plainly see of how great use mathematical learning is to mankind.' Hence you take occasion to declaim on the usefulness of mathematics in the several branches, and then to redouble your surprise and amazement (p. 12 and 20).—To all which declamation I reply, that it is quite beside the purpose.

of the Analyst upon the celebrated Mathematicians of the present age, to clear up what he styles their obscure Analytics. This last and forgotten tract consists of papers given in to the Royal Society in 1742, and treats Fluxions as a particular branch of an alleged more general reasoning, called the doctrine of *maximinority* and *minimajority*. In 1739, Robins published *Remarks* on Euler, Smith, and Jurin, to which Jurin replied in the same year. A rejoinder was published by Robins in 1740, which drew an answer from Jurin, *A Letter to —— Esqr.* (1741). Colin Maclaurin, the Scottish mathematician, published his *Treatise on Fluxions* in 1742. 'The *Analyst*,' says Professor Kelland, 'did good service to science, if in no other way, at least by giving occasion to this last work. The principles of the method had been previously exhibited in a concise and obscure manner; Maclaurin developed them after the manner of the ancient geometers.'

Berkeley refers to the *Analyst* controversy in *Siris*, sect. 271, note.

For, I allow, and always have allowed, its full claim of merit to whatever is useful and true in the mathematics: but that which is not so, the less it employs men's time and thoughts the better. And, after all you have said or can say, I believe the unprejudiced reader will think with me, that things obscure are not therefore sacred; and that it is no more a crime to canvass and detect unsound principles or false reasonings in mathematics than in any other part of learning.

3. You are, it seems, much at a loss to understand the usefulness, or tendency, or prudence of my attempt. I thought I had sufficiently explained this in the *Analyst*. But for your farther satisfaction shall here tell you, it is very well known that several persons who deride Faith and Mysteries in Religion, admit the doctrine of Fluxions for true and certain. Now, if it be shewn that fluxions are really most incomprehensible mysteries, and that those who believe them to be clear and scientific do entertain an implicit faith in the author of that method: will not this furnish a fair *argumentum ad hominem* against men who reject that very thing in religion which they admit in human learning? And is it not a proper way to abate the pride, and discredit the pretensions of those who insist upon clear ideas in points of faith, if it be shewn that they do without them even in science.

4. As to my timing this charge; why now and not before, since I had published hints thereof many years ago? Surely I am obliged to give no account of this: if what hath been said in the *Analyst* be not sufficient. Suppose that I had not leisure, or that I did not think it expedient, or that I had no mind to it. When a man thinks fit to publish anything, either in mathematics or in any other part of learning, what avails it, or indeed what right hath any one to ask—Why at this or that time; in this or that manner; upon this or that motive? Let the reader judge if it suffice not that what I publish is true, and that I have a right to publish such truths when and how I please in a free country.

5. I do not say that mathematicians, as such, are infidels; or that geometry is a friend to infidelity—which you untruly insinuate, as you do many other things; whence you raise topics for invective. But I say there are certain mathematicians who are known to be so; and that there are others who are not mathematicians who are influenced by a regard for their authority. Some,

perhaps, who live in the University, may not be apprised of this: but the intelligent and observing reader, who lives in the world, and is acquainted with the humour of the times and the characters of men, is well aware there are too many that deride mysteries and yet admire fluxions; who yield that faith to a mere mortal which they deny to Jesus Christ, whose religion they make it their study and business to discredit. The owning this is not to own that men who reason well are enemies to religion, as you would represent it: on the contrary, I endeavour to shew that such men are defective in point of reason and judgment, and that they do the very thing they would seem to despise.

6. There are, I make no doubt, among the mathematicians many sincere believers in Jesus Christ: I know several such myself: but I addressed my *Analyst* to an infidel; and, on very good grounds, I supposed that, besides him, there were other deriders of faith who had nevertheless a profound veneration for fluxions: and I was willing to set forth the inconsistence of such men. If there be no such thing as infidels who pretend to knowledge in the modern analysis, I own myself misinformed, and shall gladly be found in a mistake; but even in that case, my remarks upon fluxions are not the less true; nor will it follow that I have no right to examine them on the foot of human science, even though religion were quite unconcerned, and though I had no end to serve but truth. But you are very angry (p. 13 and 14) that I should enter the lists with reasoning infidels, and attack them upon their pretensions to science: and hence you take occasion to shew your spleen against the clergy. I will not take upon me to say that I know you to be a Minute Philosopher yourself; but I know the Minute Philosophers make just such compliments as you do to our church, and are just as angry as you can be at any who undertake to defend religion by reason. If we resolve all into faith, they laugh at us and our faith: and if we attempt to reason, they are angry at us: they pretend we get out of our province, and they recommend to us a blind implicit faith. Such is the inconsistence of our adversaries. But it is to be hoped there will never be wanting men to deal with them at their own weapons; and to shew they are by no means those masters of reason which they would fain pass for.

7. I do not say, as you would represent me, that we have no

better reason for our religion than you have for fluxions: but I say that an infidel, who believes the doctrine of fluxions, acts a very inconsistent part in pretending to reject the Christian religion—because he cannot believe what he doth not comprehend; or because he cannot assent without evidence; or because he cannot submit his faith to authority. Whether there are such infidels, I submit to the judgment of the reader. For my own part I make no doubt of it, having seen some shrewd signs thereof myself, and having been very credibly informed thereof by others. Nor doth this charge seem the less credible, for your being so sensibly touched, and denying it with so much passion. You, indeed, do not stick to affirm, that the persons who informed me are 'a pack of base, profligate, and impudent liars' (p. 27). How far the reader will think fit to adopt your passions, I cannot say; but I can truly say, the late celebrated Mr. Addison is one of the persons whom you are pleased to characterise in these modest and mannerly terms. He assured me that the infidelity of a certain noted mathematician, still living, was one principal reason assigned by a witty man [2] of those times for his being an infidel. Not that I imagine geometry disposeth men to infidelity: but that, from other causes, such as presumption, ignorance, or vanity, like other men geometricians also become infidels, and that the supposed light and evidence of their science gains credit to their infidelity.

8. You reproach me with calumny, detraction, and artifice (p. 15). You recommend such means as are innocent and just, rather than the criminal method of lessening or detracting from my opponents (Ibid.). You accuse me of the *odium theologicum*, the intemperate zeal of divines, that I do *stare super vias antiquas* (p. 13); with much more to the same effect.—For all which charge I depend on the reader's candour, that he will not take your word, but read and judge for himself. In which case he will be able to discern (though he should be no mathematician) how passionate and unjust your reproaches are, and how possible it is for a man to cry out against calumny and practise it in the same breath. Considering how impatient all mankind are when their prejudices are looked into, I do not wonder to see you rail and

[2] Dr. (Sir Samuel) Garth, who died in January 1719, a few months before Addison's own death. Dr. Halley is said to be the mathematician referred to. See Stock's *Life of Berkeley*.

rage at the rate you do. But if your own imagination be strongly shocked and moved, you cannot therefore conclude that a sincere endeavour to free a science, so useful and ornamental to human life, from those subtleties, obscurities, and paradoxes which render it inaccessible to most men, will be thought a criminal undertaking by such as are in their right mind. Much less can you hope that an illustrious Seminary of learned men, which hath produced so many free-spirited inquiries after truth, will at once enter into your passions, and degenerate into a nest of bigots.

9. I observe upon the inconsistency of certain infidel analysts. I remark some defects in the principles of the modern analysis. I take the liberty decently to dissent from Sir Isaac Newton. I propose some helps to abridge the trouble of mathematical studies, and render them more useful. What is there in all this that should make you declaim on the usefulness of practical mathematics? That should move you to cry out—*Spain, inquisition, odium theologicum?* By what figure of speech do you extend what is said of the modern analysis to mathematics in general; or what is said of mathematical infidels to all mathematicians; or the confuting an error in science to burning or hanging the authors? But it is nothing new or strange that men should choose to indulge their passions, rather than quit their opinions, how absurd soever. Hence the frightful visions and tragical uproars of bigoted men, be the subject of their bigotry what it will. A very remarkable instance of this you give (p. 27), where, upon my having said that a deference to certain mathematical infidels, as I was credibly informed, had been one motive to infidelity, you ask, with no small emotion—'For God's sake are we in England or in Spain?' 'Is this the language of a familiar who is whispering an inquisitor, &c.?' And the page before you exclaim in the following words—'Let us burn or hang up all the mathematicians in Great Britain, or halloo the mob upon them to tear them to pieces every mother's son of them, *Tros Rutulusve fuat*, laymen or clergymen, &c. Let us dig up the bodies of Dr. Barrow and Sir Isaac Newton, and burn them under the gallows.'

10. The reader need not be a mathematician to see how vain all this tragedy of yours is. And if he be as thoroughly satisfied as I am that the cause of fluxions cannot be defended by reason, he will be as little surprised as I am to see you betake yourself to

the arts of all bigoted men, raising terror and calling in the passions to your assistance. Whether those rhetorical flourishes about the inquisition and the gallows are not quite ridiculous, I leave to be determined by the reader. Who will also judge (though he should not be skilled in geometry) whether I have given the least grounds for this and a world of such-like declamation? And whether I have not constantly treated those celebrated writers with all proper respect, though I take the liberty in certain points to differ from them?

11. As I heartily abhor an inquisition in faith, so I think you have no right to erect one in science. At the time of writing your *Defence* you seem to have been overcome with passion: but, now you may be supposed cool, I desire you to reflect whether it be not wrote in the true spirit of an inquisitor? Whether this becomes a person so exceeding delicate himself upon that point? And whether your brethren the analysts will think themselves honoured or obliged by you, for having defended their doctrine in the same manner as any declaiming bigot would defend transubstantiation? The same false colours, the same intemperate sallies, and the same indignation against common sense!

12. In a matter of mere science, where authority hath nothing to do, you constantly endeavour to overbear me with authorities, and load me with envy. If I see a sophism in the writings of a great author, and, in compliment to his understanding, suspect he could hardly be quite satisfied with his own demonstration; this sets you on declaiming for several pages. It is pompously set forth, as a criminal method of detracting from great men, as a concerted project to lessen their reputation, as making them pass for impostors. If I publish my free thoughts, which I have as much right to publish as any other man, it is imputed to rashness, and vanity, and the love of opposition. Though perhaps my late publication, of what had been hinted twenty-five years ago, may acquit me of this charge in the eyes of an impartial reader. But when I consider the perplexities that beset a man who undertakes to defend the doctrine of fluxions, I can easily forgive your anger.

13. Two sorts of learned men there are: one who candidly seek truth by rational means. These are never averse to have their principles looked into, and examined by the test of reason.

Another sort there is who learn by *rote* a set of principles and a way of thinking which happen to be in vogue. These betray themselves by their anger and surprise, whenever their principles are freely canvassed. But you must not expect that your reader will make himself a party to your passions or your prejudices. I freely own that Sir Isaac Newton hath shewed himself an extraordinary mathematician, a profound naturalist, a person of the greatest abilities and erudition. Thus far I can readily go; but I cannot go the lengths that you do. I shall never say of him as you do, *Vestigia pronus adoro* (p. 70.) This same adoration that you pay to him I will pay only to truth.

14. You may, indeed, yourself be an idolater of whom you please: but then you have no right to insult and exclaim at other men, because they do not adore your idol. Great as Sir Isaac Newton was, I think he hath, on more occasions than one, shewed himself not to be infallible. Particularly, his demonstration of the doctrine of fluxions I take to be defective; and I cannot help thinking that he was not quite pleased with it himself. And yet this doth not hinder but the method may be useful, considered as an art of invention. You, who are a mathematician, must acknowledge there have been divers such methods admitted in mathematics, which are not demonstrative. Such, for instance, are the inductions of Dr. Wallis, in his Arithmetic of Infinites, and such what Harriot, and, after him, Descartes, have wrote concerning the roots of affected equations. It will not, nevertheless, thence follow that those methods are useless; but only that they are not to be allowed of as premises in a strict demonstration.

15. No great name upon earth shall ever make me accept things obscure for clear, or sophisms for demonstrations. Nor may you ever hope to deter me from freely speaking what I freely think, by those arguments *ab invidia* which at every turn you employ against me. You represent yourself (p. 52) as a man 'whose highest ambition is in the lowest degree to imitate Sir Isaac Newton.' It might, perhaps, have suited better with your appellation of *Philalethes*, and been altogether as laudable, if your highest ambition had been to discover truth. Very consistently with the character you give of yourself, you speak of it as a sort of crime (p. 70) to think it possible you should ever 'see farther, or go beyond Sir Isaac Newton.' And I am persuaded you speak the sentiments of many more

besides yourself. But there are others who are not afraid to sift the principles of human science, who think it no honour to imitate the greatest man in his defects, who even think it no crime to desire to know, not only beyond Sir Isaac Newton, but beyond all mankind. And whoever thinks otherwise, I appeal to the reader whether he can properly be called a philosopher.

16. Because I am not guilty of your mean idolatry, you inveigh against me as a person conceited of my own abilities; not considering that a person of less abilities may know more on a certain point than one of greater; not considering that a purblind eye, in a close and narrow view, may discern more of a thing than a much better eye in a more extensive prospect; not considering that this is to fix a *ne plus ultra*, to put a stop to all future inquiries; lastly, not considering that this is in fact, so much as in you lies, converting the republic of letters into an absolute monarchy, that it is even introducing a kind of philosophic popery among a free people.

17. I have said (and I venture still to say) that a fluxion is incomprehensible: that second, third, and fourth fluxions are yet more incomprehensible: that it is not possible to conceive a simple infinitesimal: that it is yet less possible to conceive an infinitesimal of an infinitesimal, and so onward[3]. What have you to say in answer to this? Do you attempt to clear up the notion of a fluxion or a difference? Nothing like it. You only 'assure me (upon your bare word) from your own experience, and that of several others whom you could name, that the doctrine of fluxions may be clearly conceived and distinctly comprehended; and that if I am puzzled about it and do not understand it, yet others do.' But can you think, Sir, I shall take your word, when I refuse to take your Master's?

18. Upon this point every reader of common sense may judge as well as the most profound mathematician. The simple apprehension of a thing defined is not made more perfect by any subsequent progress in mathematics. What any man evidently knows, he knows as well as you or Sir Isaac Newton. And every one can know whether the object of this method be (as you would have us think) clearly conceivable. To judge of this no depth of science is requisite, but only a bare attention to what passes

[3] [*Analyst*, sect. 4, 5, 6, &c.]—Author.

in his own mind. And the same is to be understood of all definitions in all sciences whatsoever. In none of which can it be supposed that a man of sense and spirit will take any definition or principle upon trust, without sifting it to the bottom, and trying how far he can or he cannot conceive it. This is the course I have taken, and shall take, however you and your brethren may declaim against it, and place it in the most invidious light.

19. It is usual with you to admonish me to look over a second time, to consult, examine, weigh the words of Sir Isaac. In answer to which I will venture to say that I have taken as much pains as (I sincerely believe) any man living to understand that great author, and to make sense of his principles. No industry, nor caution, nor attention, I assure you, have been wanting on my part. So that, if I do not understand him, it is not my fault but my misfortune. Upon other subjects you are pleased to compliment me with depth of thought and uncommon abilities (p. 5 and 84). But I freely own, I have no pretence to those things. The only advantage I pretend to is that I have always thought and judged for myself. And, as I never had a master in mathematics, so I fairly followed the dictates of my own mind in examining and censuring the authors I read upon that subject, with the same freedom that I used upon any other; taking nothing upon trust, and believing that no writer was infallible. And a man of moderate parts, who takes this painful course in studying the principles of any science, may be supposed to walk more surely than those of greater abilities, who set out with more speed and less care.

20. What I insist on is—That the idea of a fluxion, simply considered, is not at all improved or amended by any progress, though ever so great, in the analysis: neither are the demonstrations of the general rules of that method at all cleared up by applying them. The reason of which is, because, in operating or calculating, men do not return to contemplate the original principles of the method, which they constantly presuppose, but are employed in working, by notes and symbols denoting the fluxions supposed to have been at first explained, and according to rules supposed to have been at first demonstrated. This I say to encourage those who are not far gone in these studies, to use intrepidly their own judgment, without a blind or a mean deference

to the best of mathematicians, who are no more qualified than they are to judge of the simple apprehension, or the evidence of what is delivered in the first elements of the method;—men by farther and frequent use or exercise becoming only more accustomed to the symbols and rules, which doth not make either the foregoing notions more clear, or the foregoing proofs more perfect. Every reader of common sense, that will but use his faculties, knows as well as the most profound analyst what idea he frames or can frame of velocity without motion, or of motion without extension, of magnitude which is neither finite nor infinite, or of a quantity having no magnitude which is yet divisible, of a figure where there is no space, of proportion between nothings, or of a real product from nothing multiplied by something. He need not be far gone in geometry to know that obscure principles are not to be admitted in demonstration; that if a man destroys his own hypothesis, he at the same time destroys what was built upon it: that error in the premises, not rectified, must produce error in the conclusion.

21. In my opinion the greatest men have their prejudices. Men learn the elements of science from others: and every learner hath a deference more or less to authority, especially the young learners, few of that kind caring to dwell long upon principles, but inclining rather to take them upon trust: and things early admitted by repetition become familiar: and this familiarity at length passeth for evidence. Now to me it seems there are certain points tacitly admitted by mathematicians which are neither evident nor true. And such points or principles ever mixing with their reasonings do lead them into paradoxes and perplexities. If the great author of the fluxionary method was early imbued with such notions it would only shew he was a man. And if, by virtue of some latent error in his principles, a man be drawn into fallacious reasonings, it is nothing strange that he should take them for true: and, nevertheless, if, when urged by perplexities and uncouth consequences, and driven to arts and shifts, he should entertain some doubt thereof, it is no more than one may naturally suppose might befall a great genius grappling with an insuperable difficulty: which is the light in which I have placed Sir Isaac Newton[1]. Hereupon you are pleased to remark that I represent

[1] [*Analyst*, sect. 18.]—Author.

the great author not only as a weak but an ill man, as a deceiver and an impostor. The reader will judge how justly.

22. As to the rest of your colourings and glosses, your reproaches and insults and outcries, I shall pass them over, only desiring the reader not to take your word, but read what I have written, and he will want no other answer. It hath been often observed that the worst cause produceth the greatest clamour; and indeed you are so clamorous throughout your defence that the reader, although he should be no mathematician, provided he understands common sense, and hath observed the ways of men, will be apt to suspect that you are in the wrong. It should seem, therefore, that your brethren the analysts are but little obliged to you for this new method of declaiming in mathematics. Whether they are more obliged by your reasoning I shall now examine.

23. You ask me (p. 32) where I find Sir Isaac Newton using such expressions as the velocities of velocities, the second, third, and fourth velocities, &c. This you set forth as a pious fraud and unfair representation.—I answer, that if according to Sir Isaac Newton a fluxion be the velocity of an increment, then according to him I may call the fluxion of a fluxion the velocity of a velocity. But for the truth of the antecedent see his Introduction to the Quadrature of Curves, where his own words are—*Motuum vel incrementorum velocitates nominando fluxiones.* See also the second lemma of the second book of his Mathematical Principles of Natural Philosophy, where he expresseth himself in the following manner—*Velocitates incrementorum ac decrementorum, quas etiam, motus, mutationes, et fluxiones quantitatum nominare licet.* And that he admits fluxions of fluxions, or second, third, fourth fluxions, &c., see his Treatise of the Quadrature of Curves. I ask now, Is it not plain that if a fluxion be a velocity, then the fluxion of a fluxion may, agreeably thereunto, be called the velocity of a velocity? In like manner, if by a fluxion is meant a nascent augment, will it not then follow that the fluxion of a fluxion or second fluxion is the nascent augment of a nascent augment? Can anything be plainer? Let the reader now judge who is unfair.

24. I had observed that the great author had proceeded illegitimately, in obtaining the fluxion or moment of the rectangle

of two flowing quantities; and that he did not fairly get rid of the rectangle of the moments.—In answer to this you allege that the error arising from the omission of such rectangle (allowing it to be an error) is so small that it is insignificant. This you dwell upon and exemplify to no other purpose but to amuse your reader and mislead him from the question; which in truth is not concerning the accuracy of computing or measuring in practice, but concerning the accuracy of the reasoning in science. That this was really the case, and that the smallness of the practical error nowise concerns it, must be so plain to any one who reads the *Analyst* that I wonder how you could be ignorant of it.

25. You would fain persuade your reader that I make an absurd quarrel against errors of no significancy in practice, and represent mathematicians as proceeding blindfold in their approximations, in all which I cannot help thinking there is on your part either great ignorance or great disingenuity. If you mean to defend the reasonableness and use of approximations or of the method of indivisibles, I have nothing to say. But then you must remember this is not the doctrine of fluxions: it is none of that analysis with which I am concerned. That I am far from quarrelling at approximations in geometry is manifest from the thirty-third and fifty-third queries in the *Analyst*. And that the method of fluxions pretends to somewhat more than the method of indivisibles is plain; because Sir Isaac disclaims this method as not geometrical [5]. And that the method of fluxions is supposed accurate in geometrical rigour is manifest to whoever considers what the great author writes about it; especially in his Introduction to the Quadrature of Curves, where he saith, *In rebus mathematicis errores quam minimi non sunt contemnendi.* Which expression you have seen quoted in the *Analyst*, and yet you seem ignorant thereof, and indeed of the very end and design of the great author of this his invention of fluxions.

26. As oft as you talk of finite quantities inconsiderable in practice, Sir Isaac disowns your apology. *Cave*, saith he, *intellexeris finitas.* And, although quantities less than sensible may

[5] [See the Scholium at the end of the first section. Lib. I. *Phil. Nat. Prin. Math.*]—Author.

be of no account in practice, yet none of your masters, nor will even you yourself, venture to say they are of no account in theory and in reasoning. The application in gross practice is not the point questioned, but the rigour and justness of the reasoning. And it is evident that, be the subject ever so little, or ever so inconsiderable, this doth not hinder but that a person treating thereof may commit very great errors in logic; which logical errors are in nowise to be measured by the sensible or practical inconveniences thence arising, which, perchance, may be none at all. It must be owned that, after you have misled and amused your less qualified reader (as you call him), you return to the real point in controversy, and set yourself to justify Sir Isaac's method of getting rid of the above-mentioned rectangle. And here I must entreat the reader to observe how fairly you proceed.

27. First then you affirm (p. 44), 'that neither in the demonstration of the rule for finding the fluxion of the rectangle of two flowing quantities, nor in anything preceding or following it, is any mention, so much as once, made of the increment of the rectangle of such flowing quantities.' Now I affirm the direct contrary. For, in the very passage by you quoted in this same page, from the first case of the second lemma of the second book of Sir Isaac's Principles, beginning with *Rectangulum quodvis motu perpetuo auctum*, and ending with *igitur laterum incrementis totis a et b generatur rectanguli incrementum* $aB+bA$. *Q.E.D.*— in this very passage, I say, is express mention made of the increment of such rectangle. As this is matter of fact, I refer it to the reader's own eyes. Of what rectangle have we here the increment? Is it not plainly of that whose sides have a and b for their *incrementa tota*, that is, of AB. Let any reader judge whether it be not plain from the words, the sense, and the context, that the great author in the end of his demonstration understands his *incrementum* as belonging to the *rectangulum quodvis* at the beginning. Is not the same also evident from the very lemma itself prefixed to the demonstration? The sense whereof is (as the author there explains it), that if the moments of the flowing quantities A and B are called a and b, then the *momentum vel mutatio geniti rectanguli* AB will be $aB+bA$. Either therefore the conclusion of the demonstration is not the

thing which was to be demonstrated, or the *rectanguli incrementum* $aB+bA$ belongs to the rectangle AB.

28. All this is so plain that nothing can be more so; and yet you would fain perplex this plain case by distinguishing between an increment and a moment. But it is evident to every one who has any notion of demonstration that the *incrementum* in the conclusion must be the *momentum* in the lemma; and to suppose it otherwise is no credit to the author. It is in effect supposing him to be one who did not know what he would demonstrate. But let us hear Sir Isaac's own words: *Earum (quantitatum scilicet fluentium) incrementa vel decrementa momentanea sub nomine momentorum intelligo.* And you observe yourself that he useth the word *moment* to signify either an increment or decrement. Hence, with an intention to puzzle me, you propose the increment and decrement of AB, and ask which of these I would call the moment? The case you say is difficult. My answer is very plain and easy, to wit, Either of them. You, indeed, make a different answer; and from the author's saying that by a moment he understands either the momentaneous increment or decrement of the flowing quantities, you would have us conclude, by a very wonderful inference, that his moment is neither the increment nor decrement thereof. Would it not be as good an inference, because a number is either odd or even, to conclude it is neither? Can any one make sense of this? Or can even yourself hope that this will go down with the reader, how little soever qualified? It must be owned, you endeavour to intrude this inference on him, rather by mirth and humour than by reasoning. You are merry, I say, and (p. 46) represent the two mathematical quantities as pleading their rights, as tossing up cross and pile, as disputing amicably. You talk of their claiming preference, their agreeing, their boyishness, and their gravity. And after this ingenious digression you address me in the following words—Believe me, there is no remedy, you must acquiesce. But my answer is that I will neither believe you nor acquiesce; there is a plain remedy in common sense; and, to prevent surprise, I desire the reader always to keep the controverted point in view, to examine your reasons, and be cautious how he takes your word, but most of all when you are positive, or eloquent, or merry.

29. A page or two after, you very candidly represent your case to be that of an ass between two bottles of hay: it is your own expression. The cause of your perplexity is that you know not whether the velocity of AB increasing, or of AB decreasing is to be esteemed the fluxion, or proportional to the moment of the rectangle. My opinion, agreeably to what hath been premised, is that either may be deemed the fluxion. But you tell us (p. 49) 'that you think, the venerable ghost of Sir Isaac Newton whispers you, the velocity you seek for is neither the one nor the other of these, but it is the velocity which the flowing rectangle hath not while it is greater or less than AB, but at that very instant of time that it is AB.' For my part, in the rectangle AB considered simply in itself, without either increasing or diminishing, I can conceive no velocity at all. And if the reader is of my mind, he will not take either your word, or even the word of a ghost, how venerable soever, for velocity without motion. You proceed and tell us that, in like manner, the moment of the rectangle is neither its increment or decrement. This you would have us believe on the authority of his ghost, in direct opposition to what Sir Isaac himself asserted when alive. *Incrementa* (saith he) *vel decrementa momentanea sub nomine momentorum intelligo: ita ut incrementa pro momentis addititiis seu affirmativis, ac decrementa pro subductitiis seu negativis habeantur.* I will not in your style bid the reader believe me, but believe his eyes.

30. To me it verily seems that you have undertaken the defence of what you do not understand. To mend the matter, you say, 'you do not consider AB as lying at either extremity of the moment, but as extended to the middle of it; as having acquired the one half of the moment, and as being about to acquire the other; or, as having lost one half of it, and being about to lose the other.'—Now, in the name of truth, I entreat you to tell what this moment is, to the middle whereof the rectangle is extended? This moment, I say, which is acquired, which is lost, which is cut in two, or distinguished into halves? Is it a finite quantity, or an infinitesimal, or a mere limit, or nothing at all? Take it in what sense you will, I cannot make your defence either consistent or intelligible. For, if you take it in either of the two former senses, you contradict Sir Isaac

Newton. And, if you take it in either of the latter, you contradict common sense; it being plain, that what hath no magnitude, or is no quantity, cannot be divided. And here I must entreat the reader to preserve his full freedom of mind entire, and not weakly suffer his judgment to be overborne by your imagination and your prejudices, by great names and authorities, by ghosts and visions, and above all by that extreme satisfaction and complacency with which you utter your strange conceits; if words without a meaning may be called so. After having given this unintelligible account, you ask with your accustomed air, 'What say you, Sir? Is this a just and legitimate reason for Sir Isaac's proceeding as he did? I think you must acknowledge it to be so.' But, alas! I acknowledge no such thing. I find no sense or reason in what you say. Let the reader find it if he can.

31. In the next place (p. 50), you charge me with want of caution. 'Inasmuch (say you) as that quantity which Sir Isaac Newton, through his whole lemma, and all the several cases of it, constantly calls a *moment*, without confining it to be either an increment or decrement, is by you inconsiderately and arbitrarily, and without any shadow of reason given, supposed and determined to be an increment.'—To which charge I reply, that it is as untrue as it is peremptory. For that, in the foregoing citation from the first case of Sir Isaac's lemma, he expressly determines it to be an increment. And, as this particular instance or passage was that which I objected to, it was reasonable and proper for me to consider the moment in the same light. But, take it increment or decrement as you will, the objections still lie, and the difficulties are equally insuperable. You then proceed to extol the great author of the fluxionary method, and to bestow some *brusqueries* upon those who unadvisedly dare to differ from him. To all which I shall give no answer.

32. Afterwards to remove (as you say) all scruple and difficulty about this affair, you observe that the moment of the rectangle determined by Sir Isaac Newton, and the increment of the rectangle determined by me are perfectly and exactly equal, supposing a and b to be diminished *ad infinitum*: and, for proof of this, you refer to the first lemma of the first section of the first book of Sir Isaac's Principles. I answer that if a and b are real quantities, then

a b is something, and consequently makes a real difference: but if they are nothing, then the rectangles whereof they are coefficients become nothing likewise: and consequently the *momentum* or *incrementum*, whether Sir Isaac's or mine, are in that case nothing at all. As for the above-mentioned lemma, which you refer to, and which you wish I had consulted sooner, both for my own sake and for yours; I tell you I had long since consulted and considered it. But I very much doubt whether you have sufficiently considered that lemma, its demonstration, and its consequences. For, however that way of reasoning may do in the method of *exhaustions*, where quantities less than assignable are regarded as nothing; yet, for a fluxionist writing about momentums to argue that quantities must be equal because they have no assignable difference seems the most injudicious step that could be taken: it is directly demolishing the very doctrine you would defend. For, it will thence follow that all homogeneous momentums are equal, and consequently the velocities, mutations, or fluxions, proportional thereto, are all likewise equal. There is, therefore, only one proportion of equality throughout, which at once overthrows the whole system you undertake to defend. Your moments (I say) not being themselves assignable quantities, their differences cannot be assignable: and, if this be true, by that way of reasoning it will follow, they are all equal; upon which supposition you cannot make one step in the method of fluxions. It appears from hence, how unjustly you blame me (p. 32) for omitting to give any account of that first section of the first book of the *Principia*, wherein (you say) the foundation of the method of fluxions is geometrically demonstrated and largely explained, and difficulties and objections against it are clearly solved. All which is so far from being true that the very first and fundamental lemma of that section is incompatible with and subversive of the doctrine of fluxions. And, indeed, who sees not that a demonstration *ad absurdum more veterum*, proceeding on a supposition that every difference must be some given quantity, cannot be admitted in, or consist with, a method wherein quantities, less than any given, are supposed really to exist, and be capable of division?

33. The next point you undertake to defend is that method for obtaining a rule to find the fluxion of any power of a flowing

quantity, which is delivered in his Introduction to the Quadratures, and considered in the *Analyst*[6]. And here the question between us is, whether I have rightly represented the sense of those words, *evanescant jam augmenta illa*, in rendering them, 'let the increments vanish,' *i. e.* let the increments be nothing, or let there be no increments? This you deny; but, as your manner is, instead of giving a reason you declaim. I, on the contrary, affirm, the increments must be understood to be quite gone, and absolutely nothing at all. My reason is, because without that supposition you can never bring the quantity or expression

$$nx^{n-1}+\frac{nn-n}{2}ox^{n-2}+ \text{ \&c. down to } nx^{n-1},$$

the very thing aimed at by supposing the evanescence. Say whether this be not the truth of the case? Whether the former expression is not to be reduced to the latter? And whether this can possibly be done so long as o is supposed a real quantity? I cannot indeed say you are scrupulous about your affirmations, and yet I believe that even you will not affirm this; it being most evident, that the product of two real quantities is something real; and that nothing real can be rejected either according to the ἀκρίβεια of geometry, or according to Sir Isaac's own Principles; for the truth of which I appeal to all who know anything of these matters. Further, by *evanescent* must either be meant, let them (the increments) vanish and become nothing, in the obvious sense, or else let them become infinitely small. But that this latter is not Sir Isaac's sense is evident from his own words in the very same page, that is, in the last of his Introduction to the Quadratures, where he expressly saith, *volui ostendere quod in methodo fluxionum non opus sit figuras infinite parvas in geometriam introducere.* Upon the whole, you seem to have considered this affair so very superficially as greatly to confirm me in the opinion you are so angry with, to wit, that Sir Isaac's followers are much more eager in applying his method than accurate in examining his principles. You raise a dust about evanescent augments, which may perhaps amuse and amaze your reader, but I am much mistaken if it ever instructs or enlightens him. For, to come to the point, those evanescent augments either are real quantities,

[6] [Sect. 13, 14, &c.]—Author.

or they are not. If you say they are; I desire to know how you get rid of the rejectaneous quantity? If you say they are not; you indeed get rid of those quantities in the composition whereof they are coefficients; but then you are of the same opinion with me, which opinion you are pleased to call (p. 58) 'a most palpable, inexcusable, and unpardonable blunder,' although it be a truth most palpably evident.

34. Nothing, I say, can be plainer to any impartial reader than that by the evanescence of augments in the above-cited passage, Sir Isaac means their being actually reduced to nothing. But, to put it out of all doubt that this is the truth, and to convince even you, who shew so little disposition to be convinced, I desire you to look into his *Analysis per Æquationes Infinitas* (p. 20), where, in his preparation for demonstrating the first rule for the squaring of simple curves, you will find that, on a parallel occasion, speaking of an augment which is supposed to vanish, he interprets the word *evanescere* by *esse nihil*. Nothing can be plainer than this, which at once destroys your defence. And yet, plain as it is, I despair of making you acknowledge it; though I am sure you feel it, and the reader if he useth his eyes must see it. The words *evanescere sive esse nihil* do (to use your own expression) stare us in the face. Lo! This is what you call (p. 56) 'so great, so unaccountable, so horrid, so truly Bœotian a blunder,' that, according to you, it was not possible Sir Isaac Newton could be guilty of it. For the future, I advise you to be more sparing of hard words; since, as you incautiously deal them about, they may chance to light on your friends as well as your adversaries. As for my part, I shall not retaliate. It is sufficient to say you are mistaken. But I can easily pardon your mistakes. Though, indeed, you tell me, on this very occasion, that I must expect no quarter from Sir Isaac's followers. And I tell you that I neither expect nor desire any. My aim is truth. My reasons I have given. Confute them, if you can. But think not to overbear me either with authorities or harsh words. The latter will recoil upon yourselves. The former, in a matter of science, are of no weight with indifferent readers; and, as for bigots, I am not concerned about what they say or think.

35. In the next place you proceed to declaim upon the following passage, taken from the seventeenth section of the *Analyst*.

'Considering the various arts and devices used by the great author of the fluxionary method; in how many lights he placeth his fluxions; and in what different ways he attempts to demonstrate the same point: one would be inclined to think he was himself suspicious of the justness of his own demonstrations.' This passage you complain of as very hard usage of Sir Isaac Newton. You declaim copiously, and endeavour to shew that placing the same point in various lights is of great use to explain it; which you illustrate with much rhetoric. But the fault of that passage is not the hard usage it contains: but, on the contrary, that it is too modest, and not so full and expressive of my sense as perhaps it should have been. Would you like it better if I should say—'The various *inconsistent* accounts which this great author gives of his momentums and his fluxions may convince every intelligent reader that he had no clear and steady notions of them, without which there can be no demonstration?' I own frankly that I see no clearness or consistence in them. You tell me, indeed, in Miltonic verse, that the fault is in my own eyes,

> 'So thick a drop serene has quench'd their orbs,
> Or dim suffusion veil'd.'

At the same time you acknowledge yourself obliged for those various lights which have enabled you to understand his doctrine. But as for me, who do not understand it, you insult me, saying: 'For God's sake, what is it you are offended at, who do not still understand him?' May not I answer, that I am offended for this very reason—because I cannot understand him or make sense of what he says? You say to me that I am all in the dark. I acknowledge it, and entreat you who see so clearly to help me out.

36. You, Sir, with the bright eyes, be pleased to tell me, whether Sir Isaac's momentum be a finite quantity, or an infinitesimal, or a mere limit? If you say a finite quantity: be pleased to reconcile this with what he saith in the scholium of the second lemma of the first section of the first book of his Principles: *Cave intelligas quantitates magnitudine determinatas, sed cogita semper diminuendas sine limite.* If you say, an infinitesimal: reconcile this with what is said in his Introduction to the Quadratures: '*Volui ostendere quod in methodo fluxionum non opus sit figuras infinite parvas in geometriam inducere.* If you should say, it is a mere limit; be pleased to reconcile this with what we find in the first case of the

second lemma in the second book of his Principles: *Ubi de lateribus A et B deerant momentorum dimidia, &c.*—where the moments are supposed to be divided. I should be very glad a person of such a luminous intellect would be so good as to explain whether by fluxions we are to understand the nascent or evanescent quantities themselves, or their motions, or their velocities, or simply their proportions: and, having interpreted them in what sense you will, that you would then condescend to explain the doctrine of second, third, and fourth fluxions, and shew it to be consistent with common sense if you can. You seem to be very sanguine when you express yourself in the following terms: 'I do assure you, Sir, from my own experience, and that of many others whom I could name, that the doctrine may be clearly conceived and distinctly comprehended.' (p. 31.) And it may be uncivil not to believe what you so solemnly affirm, from your own experience. But I must needs own I should be better satisfied of this, if, instead of entertaining us with your rhetoric, you would vouchsafe to reconcile those difficulties, and explain those obscure points above mentioned. If either you, or any one of those many whom you could name will but explain to others what you so clearly conceive yourselves, I give you my word that several will be obliged to you who, I may venture to say, understand those matters no more than myself. But, if I am not much mistaken, you and your friends will modestly decline this task.

37. I have long ago done what you so often exhort me to do—diligently read and considered the several accounts of this doctrine given by the great author in different parts of his writings; and upon the whole I could never make it out to be consistent and intelligible. I was even led to say that 'one would be inclined to think he was himself suspicious of the justness of his own demonstrations; and that he was not enough pleased with any one notion steadily to adhere to it.' After which I added, 'Thus much is plain, that he owned himself satisfied concerning certain points, which nevertheless he could not undertake to demonstrate to others.' (See the seventeenth section of the *Analyst*.) It is one thing when a doctrine is placed in various lights; and another when the principles and notions are shifted. When new devices are introduced and substituted for others, a doctrine instead of being illustrated may be explained away. Whether there

be not something of this in the present case, I appeal to the writings of the great author—his *Methodus Rationum Primarum et Ultimarum*, his second lemma in the second book of his 'Principles,' his Introduction and Treatise of the Quadrature of Curves. In all which, it appears to me, there is not one uniform doctrine explained and carried throughout the whole, but rather sundry inconsistent accounts of this new Method, which still grows more dark and confused the more it is handled: I could not help thinking, the greatest genius might lie under the influence of false principles; and where the object and notions were exceeding obscure, he might possibly distrust even his own demonstrations. 'At least thus much seemed plain, that Sir Isaac had sometimes owned himself satisfied, where he could not demonstrate to others. In proof whereof I mentioned his letter to Mr. Collins; hereupon you tell me: there is a great deal of difference between saying, I cannot undertake to prove a thing, and I will not undertake it.' —But, in answer to this, I desire you will be pleased to consider that I was not making a precise extract out of that letter, in which the very words of Sir Isaac should alone be inserted. But I made my own remark and inference from what I remembered to have read in that letter; where, speaking of a certain mathematical matter, Sir Isaac expresseth himself in the following terms: 'It is plain to me by the fountain I draw it from, though I will not undertake to prove it to others.' Now, whether my inference may not be fairly drawn from those words of Sir Isaac Newton, and whether the difference as to the sense be so great between *will* and *can* in that particular case, I leave to be determined by the reader.

38. In the next paragraph you talk big but prove nothing. You speak of driving out of intrenchments, of sallying, and attacking, and carrying by assault; of slight and untenable works, of a new-raised and undisciplined militia, and of veteran regular troops. Need the reader be a mathematician to see the vanity of this paragraph? After this you employ (p. 65) your usual colouring, and represent the great author of the Method of Fluxions 'as a good old gentleman fast asleep, and snoring in his easy chair; while dame Fortune is bringing him her apron full of beautiful theorems and problems, which he never knows or thinks of.' This you would have pass for a consequence of my notions.—But I appeal to all those who are ever so little knowing in such matters,

whether there are not divers fountains of experiment, induction, and analogy, whence a man may derive and satisfy himself concerning the truth of many points in mathematics and mechanical philosophy, although the proofs thereof afforded by the modern analysis should not amount to demonstration? I further appeal to the conscience of all the most profound mathematicians, whether they can, with perfect acquiescence of mind, free from all scruple, apply any proposition merely upon the strength of a demonstration involving second or third fluxions, without the aid of any such experiment, or analogy, or collateral proof whatsoever? Lastly, I appeal to the reader's own heart, whether he cannot clearly conceive a medium between being fast asleep and demonstrating?—But, you will have it that I represent Sir Isaac's conclusions as coming out right, because one error is compensated by another contrary and equal error, which perhaps he never knew himself nor thought of: that by a twofold mistake he arrives though not at science yet at truth: that he proceeds blindfold, &c. All which is untruly said by you, who have misapplied to Sir Isaac what was intended for the Marquis de l'Hospital[7] and his followers; for no other end (as I can see) but that you may have an opportunity to draw that ingenious portraiture of Sir Isaac Newton and dame Fortune, as will be manifest to whoever reads the *Analyst*.

39. You tell me (p. 70) if I think fit to persist in asserting 'that this affair of a double error is entirely a new discovery of my own, which Sir Isaac and his followers never knew or thought of, that you have unquestionable evidence to convince me of the contrary, and that all his followers are already apprised that this very objection of mine was long since foreseen, and clearly and fully removed by Sir Isaac Newton, in the first section of the first book of his *Principia*.'—All which I do as strongly deny as you affirm. And I do aver that this is an unquestionable proof of the matchless contempt which you, *Philalethes*, have for truth. And I do here publicly call upon you to produce that evidence which you pretend to have, and to make good that fact which you so confidently affirm. And, at the same time, I do assure the reader that you never will, nor can.

[1] A celebrated French mathematician, author of the *Analyse des Infiniment Petits*, born 1661, died 1704.

40. If you defend Sir Isaac's notions, as delivered in his *Principia*, it must be on the rigorous foot of rejecting nothing, neither admitting nor casting away infinitely small quantities. If you defend the Marquis, whom you also style your Master, it must be on the foot of admitting that there are infinitesimals, that they may be rejected, that they are nevertheless real quantities, and themselves infinitely subdivisible. But you seem to have grown giddy with passion, and in the heat of controversy to have mistaken and forgot your part. I beseech you, Sir, to consider that the Marquis (whom alone, and not Sir Isaac, this double error in finding the subtangent doth concern) rejects indeed infinitesimals, but not on the foot that you do, to wit, their being inconsiderable in practical geometry or mixed mathematics. But he rejects them in the accuracy of speculative knowledge: in which respect there may be great logical errors, although there should be no sensible mistake in practice; which, it seems, is what you cannot comprehend. He rejects them likewise in virtue of a postulatum, which I venture to call rejecting them without ceremony. And, though he inferreth a conclusion accurately true, yet he doth it, contrary to the rules of logic, from inaccurate and false premises. And how this comes about, I have at large explained in the *Analyst*, and shewed in that particular case of tangents, that the rejectaneous quantity might have been a finite quantity of any given magnitude, and yet the conclusion have come out exactly the same way; and, consequently, that the truth of this method doth not depend on the reason assigned by the Marquis, to wit, the postulatum for throwing away infinitesimals; and, therefore, that he and his followers acted blindfold, as not knowing the true reason for the conclusions coming out accurately right, which I shew to have been the effect of a double error.

41. This is the truth of the matter, which you shamefully misrepresent and declaim upon, to no sort of purpose but to amuse and mislead your reader. For which conduct of yours throughout your remarks, you will pardon me if I cannot otherwise account, than from a secret hope that the reader of your *Defence* would never read the *Analyst*. If he doth, he cannot but see what an admirable method you take to defend your cause: how, instead of justifying the reasoning, the logic, or the theory of the case specified, which is the real point, you discourse of sensible and

practical errors: and how all this is a manifest imposition upon the reader. He must needs see that I have expressly said, 'I have no controversy except only about your logic and method: that I consider how you demonstrate; what objects you are conversant about; and whether you conceive them clearly.' That I have often expressed myself to the same effect, desiring the reader to remember, 'that I am only concerned about the way of coming at your theorems, whether it be legitimate or illegitimate, clear or obscure, scientific or tentative: that I have, on this very occasion, to prevent all possibility of mistake, repeated and insisted that I consider the geometrical analyst as a logician, *i. e.* so far forth as he reasons and argues; and his mathematical conclusions, not in themselves but in their premises; not as true or false, useful or insignificant, but as derived from such principles, and by such inferences [8].' You affirm (and indeed what can you not affirm?) that the difference between the true subtangent and that found without any compensation is absolutely nothing at all. I profess myself of a contrary opinion. My reason is, because nothing cannot be divided into parts. But this difference is capable of being divided into any, or into more than any given number of parts; for the truth of which consult the Marquis de l'Hospital. And, be the error in fact or in practice ever so small, it will not thence follow that the error in reasoning, which is what I am alone concerned about, is one whit the less, it being evident that a man may reason most absurdly about the minutest things.

42. Pray answer me fairly, once for all, whether it be your opinion that whatsoever is little and inconsiderable enough to be rejected without inconvenience in practice, the same may in like manner be safely rejected and overlooked in theory and demonstration. If you say *No*, it will then follow that all you have been saying here and elsewhere, about yards, and inches, and decimal fractions, setting forth and insisting on the extreme smallness of the rejectaneous quantity, is quite foreign to the argument, and only a piece of skill to impose upon your reader. If you say *Yes*, it follows that you then give up at once all the orders of fluxions and infinitesimal differences; and so most imprudently turn all your sallies and attacks and veterans to your

[8] [*Analyst*, sect. 20.]—Author.

own overthrow. If the reader is of my mind, he will despair of ever seeing you get clear of this dilemma. The points in controversy have been so often and so distinctly noted in the *Analyst* that I very much wonder how you could mistake, if you had no mind to mistake. It is very plain, if you are in earnest, that you neither understand me nor your Masters. And what shall we think of other ordinary analysts, when it shall be found that even you, who like a champion step forth to defend their principles, have not considered them?

43. The impartial reader is entreated to remark throughout your whole performance how confident you are in asserting, and withal how modest in proving or explaining: how frequent it is with you to employ figures and tropes instead of reasons: how many difficulties proposed in the *Analyst* are discreetly overlooked by you, and what strange work you make with the rest: how grossly you mistake and misrepresent, and how little you practise the advice which you so liberally bestow. Believe me, Sir, I had long and maturely considered the principles of the modern analysis, before I ventured to publish my thoughts thereupon in the *Analyst*. And, since the publication thereof, I have myself freely conversed with mathematicians of all ranks, and some of the ablest professors, as well as made it my business to be informed of the opinions of others, being very desirous to hear what could be said towards clearing my difficulties or answering my objections. But, though you are not afraid or ashamed to represent the analysts as very clear and uniform in their conception of these matters, yet I do solemnly affirm (and several of themselves know it to be true) that I found no harmony or agreement among them, but the reverse thereof—the greatest dissonance, and even contrariety of opinions, employed to explain what after all seemed inexplicable.

44. Some fly to proportions between nothings. Some reject quantities because infinitesimal. Others allow only finite quantities, and reject them because inconsiderable. Others place the method of fluxions on a foot with that of *exhaustions*, and admit nothing new therein. Some maintain the clear conception of fluxions. Others hold they can demonstrate about things incomprehensible. Some would prove the algorism of fluxions by *reductio ad absurdum*; others *a priori*. Some hold the evanescent

increments to be real quantities, some to be nothings, some to be limits. As many men, so many minds: each differing one from another, and all from Sir Isaac Newton. Some plead inaccurate expressions in the great author, whereby they would draw him to speak their sense; not considering that if he meant as they do, he could not want words to express his meaning. Others are magisterial and positive, say they are satisfied, and that is all; not considering that we, who deny Sir Isaac Newton's authority, shall not submit to that of his disciples. Some insist that the conclusions are true, and therefore the principles; not considering what hath been largely said in the *Analyst*[9] on that head. Lastly, several (and those none of the meanest) frankly owned the objections to be unanswerable. All which I mention by way of antidote to your false colours: and that the unprejudiced inquirer after truth may see it is not without foundation that I call on the celebrated mathematicians of the present age to clear up these obscure analytics, and concur in giving to the public some consistent and intelligible account of their great Master: which if they do not, I believe the world will take it for granted that they cannot.

45. Having gone through your defence of the British mathematicians, I find, in the next place, that you attack me on a point of metaphysics, with what success the reader will determine. I had upon another occasion many years ago wrote against *abstract* general ideas[10]. In opposition to which, you declare yourself to adhere to the vulgar opinion—that neither geometry nor any other general science can subsist without general ideas (p. 74.) This implies that I hold there are no general ideas. But I hold the direct contrary—that there are indeed general ideas, but not formed by abstraction in the manner set forth by Mr. Locke. To me it is plain there is no consistent idea the likeness whereof may not really exist: whatsoever therefore is said to be somewhat which cannot exist, the idea thereof must be inconsistent. Mr. Locke acknowledgeth it doth require pains and skill to form his general idea of a triangle. He farther expressly saith it must

[9] [Sect. 19, 20, &c.]—Author.

[10] ['Introduction' to the *Treatise concerning the Principles of Human Knowledge.*]—Author. Cf. Editor's notes on the 'Introduction' to the *Principles;* also Berkeley's reasonings against abstractions, in *Alciphron*, Dial. vii. sect. 5–8, with this and the three following sections.

be neither oblique nor rectangular, neither equilateral nor scalenum; but all and none of these at once. He also saith it is an idea wherein some parts of several different and inconsistent ideas are put together[11]. All this looks very like a contradiction. But, to put the matter past dispute, it must be noted that he affirms it to be somewhat imperfect that cannot exist; consequently, the idea thereof is impossible or inconsistent.

46. I desire to know whether it is not impossible for anything to exist which doth not include a contradiction: and, if it is, whether we may not infer that what cannot possibly exist, the same doth include a contradiction: I further desire to know, whether the reader can frame a distinct idea of anything that includes a contradiction? For my part, I cannot, nor consequently of the above-mentioned triangle; though you (who it seems know better than myself what I can do) are pleased to assure me of the contrary. Again, I ask whether that which it is above the power of man to form a complete idea of may not be called incomprehensible? And whether the reader can frame a complete idea of this imperfect impossible triangle? And, if not, whether it doth not follow that it is incomprehensible? It should seem that a distinct aggregate of a few consistent parts was nothing so difficult to conceive or impossible to exist; and that, therefore, your comment must be wide of the author's meaning. You give me to understand (p. 82) that this account of a general triangle was a trap which Mr. Locke set to catch fools. Who is caught therein let the reader judge.

47. It is Mr. Locke's opinion that every general name stands for a general abstract idea, which prescinds from the species or individuals comprehended under it. Thus, for example, according to him, the general name *colour* stands for an idea which is neither blue, red, green, nor any other particular colour, but somewhat distinct and abstracted from them all. To me it seems the word *colour* is only a more general name applicable to all and each of the particular colours: while the other specific names, as blue, red, green, and the like, are each restrained to a more limited signification. The same may be said of the word *triangle*. Let the reader judge whether this be not the case; and whether he can distinctly frame such an idea of colour as shall prescind from

[11] [*Essay on Human Understanding*, Bk. IV. ch. vii. § 9.]—AUTHOR.

all the species thereof, or of a triangle which shall answer Mr. Locke's account, prescinding and abstracting from all the particular sorts of triangles, in the manner aforesaid.

48. I entreat my reader to think. For, if he doth not, he may be under some influence from your confident and positive way of talking. But any one who thinks may, if I mistake not, plainly perceive that you are deluded, as it often happens, by mistaking the terms for ideas. Nothing is easier than to define in terms or words that which is incomprehensible in idea; forasmuch as any words can be either separated or joined as you please, but ideas always cannot. It is as easy to say a round square as an oblong square, though the former be inconceivable. If the reader will but take a little care to distinguish between the definition and the idea, between words or expressions and the conceptions of the mind, he will judge of the truth of what I now advance, and clearly perceive how far you are mistaken in attempting to illustrate Mr. Locke's doctrine, and where your mistake lies. Or, if the reader is minded to make a short work, he needs only at once to try whether, laying aside the words, he can frame in his mind the idea of an impossible triangle; upon which trial the issue of this dispute may be fairly put.—This doctrine of abstract general ideas seemed to me a capital error, productive of numberless difficulties and disputes, that runs not only throughout Mr. Locke's book, but through most parts of learning. Consequently, my animadversions thereupon were not an effect of being inclined to carp or cavil at a single passage, as you would wrongfully insinuate, but proceeded from a love of truth, and a desire to banish, so far as in me lay, false principles and wrong ways of thinking, without respect of persons. And, indeed, though you and other party-men are violently attached to your respective Masters, yet I, who profess myself only attached to truth, see no reason why I may not as freely animadvert on Mr. Locke or Sir Isaac Newton, as they would on Aristotle or Descartes. Certainly the more extensive the influence of any error, and the greater the authority which supports it, the more it deserves to be considered and detected by sincere inquirers after knowledge.

49. In the close of your performance, you let me understand

that your zeal for truth and the reputation of your Masters have occasioned your reprehending me with the utmost freedom. And it must be owned you have shewn a singular talent therein. But I am comforted under the severity of your reprehensions, when I consider the weakness of your arguments, which, were they as strong as your reproofs, could leave no doubt in the mind of the reader concerning the matters in dispute between us. As it is, I leave him to reflect and examine by your light—how clearly he is enabled to conceive a fluxion, or the fluxion of a fluxion, a part infinitely small subdivided into an infinity of parts, a nascent or evanescent increment, that which is neither something nor nothing, a triangle formed in a point, velocity without motion, and the rest of those *arcana* of the modern analysis. To conclude, I had some thoughts of advising you how to conduct yourself for the future, in return for the advice you have so freely imparted to me: but, as you think it becomes me rather to inform myself than instruct others, I shall, for my farther information, take leave to propose a few Queries to those learned gentlemen of Cambridge, whom you associate with yourself and represent as being equally surprised at the tendency of my *Analyst*.

50. I desire to know—Whether those who can neither demonstrate nor conceive the principles of the modern analysis, and yet give in to it, may not be justly said to have Faith, and be styled believers of Mysteries? Whether it is impossible to find among the physicians, mechanical philosophers, mathematicians, and philomathematicians, of the present age, some such believers, who yet deride Christians for their belief of mysteries? Whether with such men it is not a fair, reasonable, and legitimate method to use the *argumentum ad hominem?* And, being so, whether it ought to surprise either Christians or scholars? Whether in an age wherein so many pretenders to science attack the Christian religion, we may not be allowed to make reprisals, in order to shew that the irreligion of those men is not to be presumed an effect of deep and just thinking? Whether an attempt to detect false reasonings, and remedy defects in mathematics, ought to be ill received by mathematicians? Whether the introducing more easy methods, and more intelligible principles in any science should be discountenanced? Whether there may not be fair

objections as well as cavils? And whether to inquire diligently into the meaning of terms and the proof of propositions, not excepting against anything without assigning a reason, nor affecting to mistake the signification of words, or stick at an expression where the sense was clear, but considering the subject in all lights, sincerely endeavouring to find out any sense or meaning whatsoever, candidly setting forth what seems obscure and what fallacious, and calling upon those who profess the knowledge of such matters to explain them; whether, I say, such a proceeding can be justly called cavilling? Whether there be an *ipse dixit* erected? And, if so, when, where, by whom, and upon what authority? Whether, even where authority was to take place, one might not hope the mathematics, at least, would be excepted? Whether the chief end, in making mathematics so considerable a part of academical education, be not to form in the minds of young students habits of just and exact reasoning? And whether the study of abstruse and subtle matters can conduce to this end, unless they are well understood, examined, and sifted to the bottom? Whether, therefore, the bringing geometrical demonstrations to the severest test of reason should be reckoned a discouragement to the studies of any learned society? Whether, to separate the clear parts of things from the obscure, to distinguish the real principles whereon truths rest and whence they are derived, and to proportion the just measures of assent according to the various degrees of evidence, be a useless or unworthy undertaking? Whether the making more of an argument than it will bear, and placing it in an undue rank of evidence, be not the likely way to disparage it? Whether it may not be of some use, to provoke and stir up the learned professors to explain a part of mathematical learning which is acknowledged to be most profound, difficult, and obscure, and at the same time set forth by *Philalethes* and many others as the greatest instance that has ever been given of the extent of human abilities? Whether, for the sake of a great man's discoveries, we must adopt his errors? Lastly, whether in an age wherein all other principles are canvassed with the utmost freedom, the principles of Fluxions are to be alone excepted?

AN APPENDIX

CONCERNING

MR. WALTON'S VINDICATION OF SIR ISAAC NEWTON'S PRINCIPLES OF FLUXIONS[1].

1. I HAD no sooner considered the performance of *Philalethes*, but Mr. Walton's *Vindication of Fluxions* was put into my hands. As this Dublin professor gleans after the *Cantabrigian*, only endeavouring to translate a few passages from Sir Isaac Newton's *Principia*, and enlarge on a hint or two of *Philalethes*, he deserves no particular notice. It may suffice to advertise the reader that the foregoing *Defence* contains a full and explicit answer to Mr. Walton, as he will find, if he thinks it worth his pains to read what this gentleman hath written, and compare it therewith: particularly with sect. 18, 20, 30, 32—36, 43. It is not, I am sure, worth mine to repeat the same things, or confute the same notions twice over, in mere regard to a writer who hath copied even the manners of *Philalethes*, and whom in answering the other I have, if I am not much mistaken, sufficiently answered.

2. Mr. Walton touches on the same points that the other had touched upon before him. He pursues a hint which the other had given[2] about Sir Isaac's first section concerning the *rationes primæ et ultimæ*. He discreetly avoids, like the other, to say one syllable of second, third, or fourth fluxions, and of divers other points mentioned in the *Analyst*, about all which I observe in him a most prudent and profound silence. And yet he very modestly

[1] This *Vindication of Sir Isaac Newton's Principles of Fluxions*, by Mr. Walton of Dublin, was published in Dublin and London, early in 1735.

[2] [*Philalethes*, p. 32.]—AUTHOR.

gives his reader to understand that he is able to clear up all difficulties and objections that have ever been made (p. 5). Mr. Walton, in the beginning, like *Philalethes*, from a particular case makes a general inference; supposing that Infidelity to be imputed to mathematicians in general which I suppose only in the person to whom the *Analyst* was addressed, and certain other persons of the same mind with him. Whether this extraordinary way of reasoning be the cause or effect of his passion, I know not: but before I had got to the end of his *Vindication*, I ceased to be surprised at his logic and his temper in the beginning. The double error, which in the *Analyst* was plainly meant to belong to others, he with *Philalethes* (whose very oversight he adopts) supposeth to have been ascribed to Sir Isaac Newton (p. 36). And this writer also, as well as the *Cantabrigian*, must needs take upon him to explain the motive of my writing against fluxions; which he gives out, with great assurance, to have been because Sir Isaac Newton had presumed to interpose in prophecies and revelations, and to decide in religious affairs (p. 4); which is so far from being true that, on the contrary, I have a high value for those learned remains of that great man, whose original and free genius is an eternal reproach to that tribe of followers, who are always imitating but never resemble him. This specimen of Mr. Walton's truth will be a warning to the reader to use his own eyes, and in obscure points never to trust the gentleman's candour, who dares to misrepresent the plainest.

3. I was thinking to have said no more concerning this author's performance, but, lest he should imagine himself too much neglected, I entreat the reader to have the patience to peruse it; and if he finds any one point of the doctrine of fluxions cleared up, or any one objection in the *Analyst* answered, or so much as fairly stated, let him then make his compliments to the author. But, if he can no more make sense of what this gentleman has written than I can, he will need no answer to it. Nothing is easier than for a man to translate, or copy, or compose a plausible discourse of some pages in technical terms, whereby he shall make a show of saying somewhat, although neither the reader nor himself understand one tittle of it. Whether this be the case of Mr. Walton, and whether he understands either Sir Isaac Newton, or me, or himself (whatever I may think), I shall not take upon me to say.

But one thing I know, that many an unmeaning speech passeth for significant by the mere assurance of the speaker, till he cometh to be catechised upon it; and then the truth sheweth itself. This Vindicator, indeed, by his dissembling nine parts in ten of the difficulties proposed in the *Analyst,* sheweth no inclination to be catechised by me. But his scholars have a right to be informed. I therefore recommend it to them not to be imposed on by hard words and magisterial assertions, but carefully to pry into his sense, and sift his meaning, and particularly to insist on a distinct answer to the following Questions.

4. Let them ask him—Whether he can conceive velocity without motion, or motion without extension, or extension without magnitude? If he answers that he can, let him teach them to do the same. If he cannot, let him be asked, how he reconciles the idea of a fluxion which he gives (p. 13) with common sense?—Again, let him be asked, Whether nothing be not the product of nothing multiplied by something; and, if so, when the difference between the gnomen and the sum of the rectangles[3] vanisheth, whether the rectangles themselves do not also vanish? *i. e.* when ab is nothing, whether $Ab + Ba$ be not also nothing? *i. e.* whether the momentum of AB be not nothing?—Let him then be asked, what his momentums are good for, when they are thus brought to nothing?—Again, I wish he were asked to explain the difference between a magnitude infinitely small and a magnitude infinitely diminished. If he saith, there is no difference, then let him be farther asked, how he dares to explain the method of fluxions, by the *ratio* of magnitudes infinitely diminished (p. 9), when Sir Isaac Newton hath expressly excluded all consideration of quantities infinitely small[4]? If this able vindicator should say that quantities infinitely diminished are nothing at all, and consequently that, according to him, the first and last *ratios* are proportions between nothings, let him be desired to make sense of this, or explain what he means by 'proportion between nothings.' If he should say, the ultimate proportions are the *ratios* of mere limits, then let him be asked how the limits of lines can be proportioned or divided?—After all, who knows but this gentleman, who hath already complained of me for

[3] [See *Vindication*, p. 17.]—Author.
[4] [See his Introduction to the Quadratures.]—Author.

an uncommon way of treating mathematics and mathematicians (p. 5), may (as well as the *Cantabrigian*) cry out—Spain and the inquisition! when he finds himself thus closely pursued and beset with interrogatories? That we may not, therefore, seem too hard on an innocent man, who probably meant nothing, but was betrayed by following another into difficulties and straits that he was not aware of, I shall propose one single expedient, by which his disciples (whom it most concerns) may soon satisfy themselves whether this Vindicator really understands what he takes upon him to vindicate.—It is, in short, that they would ask him to explain the second, third, or fourth fluxions upon his principles. Be this the touchstone of his *Vindication*. If he can do it, I shall own myself much mistaken: if he cannot, it will be evident that he was much mistaken in himself, when he presumed to defend fluxions without so much as knowing what they are. So, having put the merits of the cause on this issue, I leave him to be tried by his scholars.

REASONS

FOR NOT REPLYING TO

MR. WALTON'S FULL ANSWER,

IN A

LETTER TO P. T. P.

1735.

REASONS

FOR NOT REPLYING TO MR. WALTON'S FULL ANSWER[1].

1. THERE are some men that can neither give nor take an answer, but, writing merely for the sake of writing, multiply words to no purpose. There are also certain careless writers that, in defiance of common sense, publish such things as, though they are not ashamed to utter, yet, other men may well be ashamed to answer. Whether there be anything in Mr. Walton's method of vindicating Fluxions, that might justify my taking no farther notice of him, on the above-mentioned considerations, I leave you and every other reader to judge. But those, Sir, are not the reasons I shall assign for not replying to Mr. Walton's full answer. The true reason is, that he seems at bottom a facetious man, who, under the colour of an opponent, writes on my side of the question, and really believes no more than I do of Sir Isaac Newton's doctrine about fluxions, which he exposes, contradicts, and confutes, with great skill and humour, under the mask of a grave vindication.

2. At first I considered him in another light, as one who had good reason for keeping to the beaten track, who had been used to dictate, who had terms of art at will, but was indeed at small trouble about putting them together, and perfectly easy about his readers understanding them. It must be owned, in an age of so much ludicrous humour, it is not every one can at first sight discern a writer's real design. But, be a man's assertions ever so

[1] These *Reasons*, first published in Dublin and London in 1735, were occasioned by Walton's *Catechism of the Author of the Minute Philosopher fully answered*, which appeared early in that year. A second edition of Walton's *Catechism* contains an Appendix in answer to Berkeley's *Reasons*, to which the Bishop made no reply.

strong in favour of a doctrine, yet if his reasonings are directly levelled against it, whatever question there may be about the matter in dispute, there can be none about the intention of the writer. Should a person, so knowing and discreet as Mr. Walton, thwart and contradict Sir Isaac Newton, under pretence of defending his fluxions, and should he at every turn say such uncouth things of these same fluxions, and place them in such odd lights as must set all men in their wits against them, could I hope for a better second in this cause? Or could there remain any doubt of his being a disguised Free-thinker in mathematics, who defended fluxions just as a certain Free-thinker[2] in religion did the rights of the Christian church?

3. Mr. Walton indeed after his free manner calls my *Analyst* a libel[3]. But this ingenious gentleman well knows a bad vindication is the bitterest libel. Had you a mind, Sir, to betray and ridicule any cause under the notion of vindicating it, would you not think it the right way to be very strong and dogmatical in the affirmative, and very weak and puzzled in the argumentative parts of your performance? To utter contradictions and paradoxes without remorse, and to be at no pains about reconciling or explaining them? And with great good-humour, to be at perpetual variance with yourself and the author you pretend to vindicate? How successfully Mr. Walton hath practised these arts, and how much to the honour of the great client he would seem to take under his protection, I shall particularly examine throughout every article of his full answer.

4. First, then, saith Mr. Walton, 'I am to be asked, whether I can conceive velocity without motion, or motion without extension, or extension without magnitude?' To which he answereth in positive terms, that he can conceive velocity and motion in a point (p. 7). And to make out this he undertakes to demonstrate, 'that if a thing be moved by an agent operating continually by the same force, the velocity will not be the same in any two different points of the described space; but that it must vary upon the least change of space.'—Now, admitting thus much to be demonstrated, yet I am still at a loss to conceive how

[2] The reference is to Tindal's *Rights of the Christian Church*. Cf. *Vindication of New Theory of Vision*, sect. 5, note.

[3] [*Vindication*, p. 1.]—AUTHOR.

Mr. Walton's conclusion will follow, to wit, 'that I am greatly mistaken in imagining there can be no motion, no velocity, in a point of space' (p. 10). Pray, Sir, consider his reasoning. The same velocity cannot be in two points of space; therefore velocity can be in a point of space. Would it not be just as good reasoning to say, the same man cannot be in two nutshells; therefore a man can be in a nutshell? Again, velocity must vary upon the least change of space; therefore there may be velocity without space. Make sense of this if you can. What have these consequences to do with their premises? Who but Mr. Walton could have inferred them? Or how could even he have inferred them had it not been in jest?

5. Suppose the centre of a falling body to describe a line; divide the time of its fall into equal parts, for instance, into minutes. The spaces described in those equal parts of time will be unequal. That is, from whatsoever points of the described line you measure a minute's descent, you will still find it a different space. This is true. But how or why from this plain truth a man should infer, that motion can be conceived in a point, is to me as obscure as any the most obscure mysteries that occur in this profound author. Let the reader make the best of it. For my part, I can as easily conceive Mr. Walton should walk without stirring, as I can his idea of motion without space. After all, the question was not whether motion could be proved to exist in a point, but only whether it could be conceived in a point. For, as to the proof of things impossible, some men have a way of proving that may equally prove anything. But I much question whether any reader of common sense will undertake to conceive what this pleasant man at inference undertakes to prove.

6. If Mr. Walton really meant to defend the author of the fluxionary method, would he not have done it in a way consistent with this illustrious author's own principles? Let us now see what may be Sir Isaac's notion about this matter. He distinguisheth two sorts of motion, absolute and relative. The former he defineth to be a translation from absolute place to absolute place, the latter from one relative place to another[4].

[4] [See Schol. def. VIII. *Philos. Nat. Princip. Math.*]—Author.

Mr. Walton's is plainly neither of these sorts of motion. But some third kind, which what it is, I am at a loss to comprehend. But I can clearly comprehend that, if we admit motion without space, then Sir Isaac Newton's account of it must be wrong: for place by which he defines motion is, according to him, a part of space. And if so, then this notable defender hath cut out new work for himself to defend and explain. But about this, if I mistake not, he will be very easy. For, as I said before, he seems at bottom a back friend to that great man; which opinion you will see farther confirmed in the sequel.

7. I shall no more ask Mr. Walton to explain anything: for I can honestly say, the more he explains, the more I am puzzled. But I will ask his readers to explain, by what art a man may conceive motion without space. And, supposing this to be done, in the second place to explain, how it consists with Sir Isaac Newton's account of motion. Is it not evident that Mr. Walton hath deserted from his old master, and been at some pains to expose him, while he defends one part of his principles by overturning another? Let any reader tell me, what Mr. Walton means by motion, or, if he can guess, what this third kind is, which is neither absolute nor relative, which exists in a point, which may be conceived without space. This learned professor saith, 'I have no clear conception of the principles of motion' (p. 24). And in another place (p. 7) he saith, 'I might have conceived velocity in a point, if I had understood and considered the nature of motion.' I believe I am not alone in not understanding his principles. For myself, I freely confess the case to be desperate. I neither understand them, nor have any hopes of ever being able to understand them.

8. Being now satisfied that Mr. Walton's aim is not to clear up or defend Sir Isaac's principles, but rather to contradict and expose them, you will not, I suppose, think it strange, if—instead of putting questions to this intrepid answerer, who is never at a loss, how often soever his readers may—I entreat you, or any other man of plain sense, to read the following passage, cited from the thirty-first section of the *Analyst*, and then try to apply Mr. Walton's answer to it: whereby you will clearly perceive what a vein of raillery that gentleman is master of. 'Velocity necessarily implies both time and space, and cannot be conceived

without them. And if the velocities of nascent or evanescent quantities, *i. e.* abstracted from time and space, may not be comprehended, how can we comprehend and demonstrate their proportions? Or consider their *rationes primæ et ultimæ*. For, to consider the proportion or ratio of things implieth that such things have magnitude: that such their magnitudes may be measured, and their relations to each other known. But, as there is no measure of velocity except time and space, the proportion of velocities being only compounded of the direct proportion of the spaces and the reciprocal proportion of the times; doth it not follow, that to talk of investigating, obtaining, and considering the proportions of velocities, exclusively of time and space, is to talk unintelligibly?' Apply now, as I said, Mr. Walton's full answer, and you will soon find how fully you are enlightened about the nature of fluxions.

9. In the following article of Mr. Walton's full answer, he saith divers curious things, which being derived from this same principle—that motion may be conceived in a point—are altogether as incomprehensible as the origin from whence they flow. It is obvious and natural to suppose *Ab* and *Ba*[5] to be rectangles produced from finite lines multiplied by increments. Mr. Walton indeed supposeth that when the increments vanish or become nothing the velocities remain, which being multiplied by finite lines produce those rectangles (p. 13). But, admitting the velocities to remain, yet how can any one conceive a rectangular surface to be produced from a line multiplied by velocity, otherwise than by supposing such line multiplied by a line or increment which shall be exponent of or proportional to such velocity? You may try to conceive it otherwise. I must own I cannot. Is not the increment of a rectangle itself a rectangle? must not then *Ab* and *Ba* be rectangles? and must not the coefficients or sides of rectangles be lines? Consequently are not *b* and *a* lines, or (which is the same thing) increments of lines? These increments may indeed be considered as proportional to and exponents of velocity. But exclusive of such exponents to talk of rectangles under lines and velocities is, I conceive, to talk unintelligibly. And yet this is what Mr. Walton doth, when he maketh *b* and *a* in the rectangles *Ab* and *Ba* to denote mere velocities.

[5] [See *Nat. Phil. Princip. Math.* l. II. lem. 2.]—AUTHOR.

10. As to the question, whether nothing be not the product of nothing multiplied by something, Mr. Walton is pleased to answer in the affirmative. And nevertheless, when *ab* is nothing, that is, when *a* and *b* are nothing, he denies that $Ab+Ba$ is nothing. This is one of those many inconsistencies which I leave the reader to reconcile. But, saith Mr. Walton, the sides of the given rectangle still remain, which two sides according to him must form the increment of the flowing rectangle. But in this he directly contradicts Sir Isaac Newton, who asserts that $Ab+Ba$ and not $A+B$ is the increment of the rectangle $A.B.$ And, indeed, how is it possible a line should be the increment of a surface? *Laterum incrementis totis a et b generatur rectanguli incrementum* $Ab+Ba$, are the words of Sir Isaac[6], which words seem utterly inconsistent with Mr. Walton's doctrine. But no wonder that gentleman should not agree with Sir Isaac, since he cannot agree even with himself; but contradicts what he saith elsewhere, as the reader may see, even before he gets to the end of that same section, wherein he hath told us, that 'the gnomon and the sum of the two rectangles are turned into those two sides by a retroverted motion' (pp. 11 and 12). Which proposition, if you or any other person should try to make sense of, you may possibly be convinced that this profound author is as much at variance with common sense as he is with himself and Sir Isaac Newton.

11. Mr. Walton, in the ninth page of his *Vindication*, in order to explain the nature of fluxions, saith that 'to obtain the last ratio of synchronal increments, the magnitude of those increments must be infinitely diminished.' Notwithstanding which, in the twenty-third page of his full answer, he chargeth me as greatly mistaken, in supposing that he explained the doctrine of fluxions by the ratio of magnitudes infinitely diminished. It is an easy matter for any author to write so as to betray his readers into mistakes about his meaning. But then it is not easy to conceive what right he hath to upbraid them with such their mistakes. If I have mistaken his sense, let any one judge if he did not fairly lead me into the mistake. When a man puzzleth his reader, saith and unsaith, useth ambiguous terms and obscure terms, and

[6] [See *Nat. Phil. Princip. Math.* l. II. lem. 2.]—Author.

putteth them together in so perverse a manner that it is odds you can make out no sense at all, or, if any, wrong sense; pray who is in fault but the writer himself? Let any one consider Mr. Walton's own words, and then say whether I am not justified in making this remark.

12. In the twentieth page of his full answer, Mr. Walton tells us that 'fluxions are measured by the first or last proportions of isochronal increments generated or destroyed by motion.' A little after he saith, these ratios subsist when the isochronal increments have no magnitude. Now, I would fain know whether the isochronal increments themselves subsist when they have no magnitude? Whether by isochronal increments we are not to understand increments generated in equal times? Whether there can be an increment where there is no increase, or increase where there is no magnitude? Whether if magnitudes are not generated in those equal times, what else is generated therein, or what else is it that Mr. Walton calls isochronal? I ask the reader these questions. I dare not ask Mr. Walton. For, as I hinted before, the subject grows still more obscure in proportion as this able writer attempts to illustrate it.

13. We are told (p. 22) 'that the first or last ratio of the isochronal spaces hath a real existence, forasmuch as it is equal to the ratio of the two motions of two points; which motions, subsisting when the isochronal spaces are nothing, preserve the existence of the first or last ratio of these spaces, or keep it from being a ratio of nothings.' In order to assist your understanding, it must not be omitted that the said two points are supposed to exist at the same time in one point, and to be moved different ways without stirring from that point. Mr. Walton hath the conscience to call this riddle a full and clear answer: to make sense of which you must suppose it one of his ironies. In the next and last article of his performance, you still find him proceed in the same vein of raillery upon fluxions.

14. It will be allowed that whoever seriously undertook to explain the second, third, and fourth fluxions of Sir Isaac Newton would have done it in a way agreeable to that great man's own doctrine. What Sir Isaac's precise notion is I will not pretend to say. And yet I will venture to say, it is something that cannot be explained by the three dimensions of a cube. I frankly

own, I do not understand Sir Isaac's doctrine so far as to frame a positive idea of his fluxions. I have, nevertheless, a negative conception thereof, so far as to see that Mr. Walton is in jest, or (if in earnest) that he understands it no more than I do.

15. Sir Isaac tells us that he considers indeterminate quantities as flowing, or in other words, as increasing or decreasing by a perpetual motion. Which quantities he denotes by the latter letters of the alphabet, and their fluxions or celerities of increasing by the same letters pointed over head, and the fluxions of fluxions or second fluxions, *i. e.* the mutations more or less swift of the first celerities, by the same letters pointed with double points; and the mutations of those mutations of the first mutations or fluxions or celerities of increasing, which he calls fluxions of fluxions of fluxions, or third fluxions, by three points; the fourth fluxions by four points; the fifth by five; and so on[7]. Sir Isaac, you see, speaks of quantity in general. And in the *Analyst* the doctrine is exemplified and the case is put in lines. Now in lines, where there is only one dimension, how are we enabled to conceive second, third, or fourth fluxions, by conceiving the generation of three dimensions in a cube? Let any one but read what Sir Isaac Newton or what I have said, and then apply what Mr. Walton hath written about the three dimensions of a cube, and see whether the difficulties are solved, or the doctrine made one whit the clearer by this explication.

16. That you may the better judge of the merit of this part of Mr. Walton's performance, I shall beg leave to set down a passage or two from the *Analyst*. 'As it is impossible to conceive velocity without time or space, without either finite length or finite duration, it must seem above the power of man to comprehend even the first fluxions. And if the first are incomprehensible, what shall we say of the second and third fluxions, &c.? He who can conceive the beginning of a beginning, or the end of an end, somewhat before the first or after the last, may perhaps be sharp-sighted enough to conceive these things. But most men, I believe, will find it impossible to understand them in any sense whatsoever. One would think that men could not speak too exactly on so nice a subject. And yet we may often observe

[7] [See his Treatise *De Quadratura Curvarum*.]—Author.

that the exponents of fluxions, or notes representing fluxions are confounded with the fluxions themselves. Is not this the case when, just after the fluxions of flowing quantities were said to be the celerities of their increasing, and the second fluxions to be the mutations of the first fluxions or celerities, we are told that $\dot{z}. \ddot{z}. \dddot{z}. \ddddot{z}. \dot{\ddddot{z}}. \ddot{\ddddot{z}}.$ represents a series of quantities, whereof each subsequent quantity is the fluxion of the preceding; and each foregoing is a fluent quantity having the following one for its fluxion? Divers series of quantities and expressions, geometrical and algebraical, may be easily conceived, in lines, in surfaces, in species, to be continued without end or limit. But it will not be found so easy to conceive a series, either of mere velocities or of mere nascent increments, distinct therefrom and corresponding thereunto [8].' Compare what is here said with Mr. Walton's genesis of a cube, and you will then clearly see how far this answerer is from explaining the nature of second, third, and fourth fluxions: and how justly I might repay that gentleman in kind, and tell him in his own language, that 'all his skill is vain and impertinent.' (*Vind.* p. 36.)

17. But it doth not become me to find fault with this learned professor, who at bottom militates on my side, and in this very section makes it his business directly to overthrow Sir Isaac Newton's doctrine. For he saith in plain terms that there can be no fourth fluxion of a cube (p. 25), that is, there can be no second fluxion of a line, and *à fortiori*, no third, fourth, fifth, &c. Insomuch that, with one single dash of his pen, Mr. Walton destroys, to the great relief of the learned world, an indefinite rank of fluxions of different orders that might have reached from pole to pole. I had distinctly pointed out the difficulties, in several parts both of my *Analyst* and *Defence*, and I leave you to judge whether he explains, or even attempts to explain, one of them. Instead thereof he tells us of the trine dimension of a cube generated by motion: whence he takes occasion, as hath been observed, to explode Sir Isaac's own doctrine, which is utterly inconsistent with Mr. Walton's. And can you now doubt the real design of this egregious vindicator?

18. Before ever Sir Isaac Newton thought of his fluxions,

[8] [*Analyst*, sect. 44—46.]—Author.

everybody knew there were three dimensions in a cube, and that a solid might be generated by the motion of a surface, a surface by the motion of a line, and a line by the motion of a point. And this in effect is all we know from Mr. Walton's explication. As for his dwelling so minutely on the genesis of the solid parts of a cube, a thing so foreign from the purpose, the only rational account I can give of it is that Mr. Walton, by puzzling the imagination of his vulgar readers, hoped the better to disguise his betraying the doctrine of his great client, which to a discerning eye he manifestly gives up; and instead thereof humorously substitutes what all the world knew before Sir Isaac was born, to wit, the three dimensions of a cube and the genesis thereof by motion.

19. Upon the whole, I appeal to you and every intelligent reader, whether this thing, which Mr. Walton is pleased ironically to call a 'full answer,' doth not carry throughout a sly insinuation—that the profound science of fluxions cannot be maintained but by the help of most unintelligible paradoxes and inconsistencies? So far, indeed, as affirmations go, he sheweth himself an able support of Sir Isaac Newton. But then in his reasonings he drops that great man upon the most important points, to wit, his doctrine of motion and his doctrine of fluxions; not regarding how far the demonstration of his famous *Principia* is interested therein. To convince you still more and more of the truth hereof, do but reflect a little on Mr. Walton's conduct. Can you think it probable that so learned and clear-headed a writer would have laid down such a direct repugnancy to common sense, as his idea of motion in a point, for the groundwork of his explanation, had it been his real intention to explain? Or, can you suppose he would have been absolutely silent on so many points urged home both in the *Analyst* and *Defence*, which it concerned a vindicator of Sir Isaac not to have overlooked? Can you imagine that if he meant seriously to defend the doctrine of fluxions, he would have contented himself with barely asserting that 'Sir Isaac Newton in the introduction to his Quadrature of Curves, in the second lemma of the second book, and in the scholium to the first section of the first book of his Principles of Philosophy, hath delivered his doctrine of fluxions in so clear and distinct a manner, without the least inconsistency in terms

or arguments, that one would have thought it impossible for any person not to have understood him.' (p. 30.)

20. Is it possible, I say, that Mr. Walton could in earnest hope we should take his bare word, as so much more credible than Sir Isaac's, and not rather have endeavoured to answer the questions, and reconcile the difficulties set forth in my *Defence of Free-thinking*; for instance, in sect. 36? Wherein I entreat my antagonist to explain 'whether Sir Isaac's momentum be a finite quantity, or an infinitesimal, or a mere limit,' adding, 'If you say a finite quantity, be pleased to reconcile this with what he saith in the scholium of the second lemma of the first section of the first book of his Principles—*Cave intelligas quantitates magnitudine determinatas, sed cogita semper diminuendas sine limite.* If you say, an infinitesimal: reconcile this with what is said in his introduction to the Quadratures—*Volui ostendere quod in methodo fluxionum non opus sit figuras infinite parvas in geometriam inducere.* If you should say, it is a mere limit, be pleased to reconcile this with what we find in the first case of the second lemma in the second book of his Principles—*Ubi de lateribus A et B deerant momentorum dimidia, &c., where the moments are supposed to be divided.*'—I shall scarce think it worth my while to bestow a serious thought on any writer who shall pretend to maintain Sir Isaac's doctrine, and yet leave this passage without a reply. And the reader, I believe, will think with me that, in answer to difficulties distinctly proposed and insisted on, to offer nothing but a magisterial assertion is a mere grimace of one who made merry with fluxions, under the notion of defending them. And he will be farther confirmed in this way of thinking, when he observes that Mr. Walton hath not said one syllable in reply to those several sections of my *Defence*, which I had particularly referred to, as containing a full answer to his *Vindication*. But it is no wonder if, with Sir Isaac's doctrine, he should drop also his own arguments in favour thereof.

21. I have been at the pains once for all to write this short comment on Mr. Walton, as the only way I could think of for making him intelligible, which will also serve as a key to his future writings on this subject. And I was the rather inclined to take this trouble, because it seemeth to me there is no part

of learning that wants to be cleared up more than this same doctrine of fluxions, which hath hitherto walked about in a mist to the stupefaction of the literati of the present age. To conclude, I accept this professor's recantation, nor am at all displeased at the ingenious method he takes to disguise it. Some zealous fluxionists may perhaps answer him.

THE QUERIST,

CONTAINING SEVERAL QUERIES,

PROPOSED

TO THE CONSIDERATION OF THE PUBLIC.

I the Lord have brought down the high tree, have exalted the low tree, have dried up the green tree, and have made the dry tree to flourish.—Ezek. xvii. 24.

1735—1737.

ADVERTISEMENT BY THE AUTHOR[1].

THE *Querist* was first printed in the year one thousand seven hundred and thirty-five; since which time the face of things is somewhat changed. In this edition some alterations have been made. The three Parts are published in one; some few Queries are added, and many omitted — particularly of those relating to the sketch or plan

[1] The *Querist* is the first in chronological order of Berkeley's tracts on the Social and Economical Condition of Ireland, written when he was Bishop of Cloyne. These tracts show his extensive acquaintance with trade, agriculture, finance, and the arts of life. The others follow the *Querist* in this edition of his *Works*.

The first edition of the *Querist* was issued at Dublin in three successive Parts. Part I. appeared in 1735, about a year after Berkeley was settled in Cloyne. It was followed by Part II. in June 1736, and by Part III. in 1737.

I have sought in vain for a sight of the first edition. In a letter to Mr. Prior, dated 'Cloyne, February 1746,' Berkeley speaks of that edition as then exhausted, mentioning that Dean Gervais could not find a copy in the shops to present to the Lord Lieutenant. 'I wish,' he adds, 'you could get one handsomely bound for his Excellency; or at least the last published, relating to the Bank, which consisted of excerpta out of the three Parts of the *Querist*. I wrote to you before to procure two copies of this for his Excellency and Mr. Liddell.'

A new edition was published in London in 1750, with the above Advertisement prefixed, and the *Word to the Wise* annexed.

It was followed in 1751 by a Glasgow edition of the same two works, 'printed and sold by Robert and Andrew Fowlis, printers to the University,' containing the following Preface:—

'The Printers to the Reader.

'This city and the neighbouring country have been of late years distinguished for their industry and application to the improvement of manufactures, trade, and agriculture, a like spirit diffusing itself over many parts of Scotland. We could wish, therefore, to render printing in this place not only subservient to religious literature, but also to the knowledge of trade and manufactures; and have of late applied ourselves particularly to republish some of the most remarkable books of that kind. We began with the celebrated Law's *Treatise on Money and Trade*. We reprinted Mr. Gee on *The Trade and Navigation of Great Britain*, as a book universally approved and esteemed. With the same view we have just now in the press Sir Josiah Child on *Trade and the Interest of Money*, and Mr. Law's other treatise, entitled *Proposals and Reasons for constituting a Council of Trade in Scotland*. In prosecution of the same plan, we have just now reprinted the *Querist*, originally printed in Dublin, which was put into our hands by a friend whom we look upon as a zealous lover of the improvements of his country.'

'The *Querist* was wrote with a design to promote the improvement of Ireland, and appears to have had no small effects that way, from the public spirit which has of late years discovered itself, and seems every year to increase in that kingdom.'

'We see nowhere such noble Associa-

of a national bank; which it may be time enough to take again in hand when the public shall seem disposed to make use of such an expedient. I had determined with myself never to prefix my name to the *Querist*, but in the last edition[2] was overruled by a friend[3], who was remarkable for pursuing the public interest with as much diligence as others do their own. I apprehend the same censure on this that I incurred upon another occasion[4], for meddling out of my profession. Though to feed the hungry and clothe the naked, by promoting an honest industry, will, perhaps, be deemed no improper employment for a clergyman who still thinks himself a member of the commonwealth. As the sum of human happiness is supposed to consist in the goods of mind, body, and fortune, I would fain make my studies of some use to mankind, with regard to each of these three particulars, and hope it will not be thought faulty or indecent in any man, of what profession soever, to offer his mite towards improving the manners, health, and prosperity of his fellow-creatures.

tions, such generous zeal, such extensive attention among the gentlemen to promote, by well-judged premiums, every valuable branch of manufacture, and every improvement beneficial to their country.'

'If reprinting this small work here shall contribute to make it more generally known and attended to among us, the Printers flatter themselves they will have done a thing acceptable to every one who is a lover of the improvement of his country. We have nowhere found, in so small a compass, so just and extensive a view of the true sources of wealth and happiness to a country, so many valuable hints for improving the necessary, the useful, and the ornamental arts. Many of these are at least as far behind still in this country as in Ireland.'

'Mutato nomine, de te fabula narratur.'

'Glasgow, *January* 10, 1751.'

The *Querist* was republished in the *Miscellany* in 1752. A succession of reprints followed.

In 1829, an edition of the *Querist* was published in London, 'with notes showing how many of the same Questions still remain to be asked respecting Ireland.' The notes are for the most part slight and superficial.

In his Preface, the Editor of the 1829 edition describes the principal value of the work as consisting in 'the simple, clear, and vigorous statement of great, liberal, and, though not new, unacknowledged truths, on questions relating to Trade and Money. Other questions of Political Economy—such as regard population, poor, &c.—the bold mind of Berkeley seems not to have grappled with, or at least to have confined itself to their consideration under local circumstances.'

Berkeley returns, in the *Querist*, to the themes of the *Essay* which he published fourteen years before, after the social disasters of the South Sea project.

[2] i. e. the edition of 1750.

[3] Probably Mr. Prior.

[4] The Tar-water controversy, in which this complaint was made in more than one of the polemical pamphlets, e. g. *Anti-Siris*.

THE QUERIST[1].

Query 1. WHETHER there ever was, is, or will be, an industrious nation poor, or an idle rich?

2. Whether a people can be called poor, where the common sort are well fed, clothed, and lodged?

3. Whether the drift and aim of every wise state should not be, to encourage industry in its members? And whether those who employ neither heads nor hands for the common benefit deserve not to be expelled like drones out of a well-governed state?

4. Whether the four elements, and man's labour therein, be not the true source of wealth?

5. Whether money be not only so far useful, as it stirreth up industry, enabling men mutually to participate the fruits of each other's labour?

6. Whether any other means, equally conducing to excite and circulate the industry of mankind, may not be as useful as money?

7. Whether the real end and aim of men be not power? And whether he who could have everything else at his wish or will would value money?

8. Whether the public aim in every well-governed state be not

[1] The pervading lesson of the *Querist* is that of the other politico-economical tracts of Berkeley—that Industry is the soul of social prosperity—that 'the four elements, and man's labour therein, are the true source of Wealth'—and that any scheme for the welfare of the nation 'should take in the whole inhabitants.' 'The patriotism of Berkeley,' says Sir James Mackintosh, 'was not, like that of Swift, tainted by disappointed ambition; nor was it, like Swift's, confined to a colony of English Protestants. Perhaps the *Querist* contains more hints, then original, still unapplied in legislation and political economy, than are to be found in any equal space.'

The *Querist* seems to have been the cause, and in some measure the consequence, of organised endeavours on an extensive scale, by patriotic Irish gentlemen—pre-eminent among whom was Thomas Prior, Berkeley's life-long friend and correspondent—to promote the agriculture, manufactures, and commerce of Ireland. See, e. g. the *Dublin Society Essays* on these questions. These *Essays* appeared weekly in 1737 and 1738, and were published collectively, in Dublin and London, in 1740.

that each member, according to his just pretensions and industry, should have power?

9. Whether power be not referred to action; and whether action doth not follow appetite or will?

10. Whether fashion doth not create appetites; and whether the prevailing will of a nation is not the fashion?

11. Whether the current of industry and commerce be not determined by this prevailing will?

12. Whether it be not owing to custom that the fashions are agreeable?

13. Whether it may not concern the wisdom of the legislature to interpose in the making of fashions; and not leave an affair of so great influence to the management of women and fops, tailors and vintners?

14. Whether reasonable fashions are a greater restraint on freedom than those which are unreasonable?

15. Whether a general good taste in a people would not greatly conduce to their thriving? And whether an uneducated gentry be not the greatest of national evils?

16. Whether customs and fashions do not supply the place of reason in the vulgar of all ranks? Whether, therefore, it doth not very much import that they should be wisely framed?

17. Whether the imitating those neighbours in our fashions, to whom we bear no likeness in our circumstances, be not one cause of distress to this nation?

18. Whether frugal fashions in the upper rank, and comfortable living in the lower, be not the means to multiply inhabitants?

19. Whether the bulk of our Irish natives are not kept from thriving, by that cynical content in dirt and beggary which they possess to a degree beyond any other people in Christendom?

20. Whether the creating of wants be not the likeliest way to produce industry in a people? And whether, if our peasants were accustomed to eat beef and wear shoes, they would not be more industrious?

21. Whether other things being given, as climate, soil, &c., the wealth be not proportioned to the industry, and this to the circulation of credit, be the credit circulated or transferred by what marks or tokens soever?

22. Whether, therefore, less money, swiftly circulating, be not, in effect, equivalent to more money slowly circulating? Or, whether, if the circulation be reciprocally as the quantity of coin, the nation can be a loser?

23. Whether money is to be considered as having an intrinsic value, or as being a commodity, a standard, a measure, or a pledge, as is variously suggested by writers? And whether the true idea of money, as such, be not altogether that of a ticket or counter?

24. Whether the value or price of things be not a compounded proportion, directly as the demand, and reciprocally as the plenty?

25. Whether the terms crown, livre, pound sterling, &c., are not to be considered as exponents or denominations of such proportion? And whether gold, silver, and paper are not tickets or counters for reckoning, recording, and transferring thereof?

26. Whether the denominations being retained, although the bullion were gone, things might not nevertheless be rated, bought, and sold, industry promoted, and a circulation of commerce maintained?

27. Whether an equal raising of all sorts of gold, silver, and copper coin can have any effect in bringing money into the kingdom? And whether altering the proportions between the several sorts can have any other effect but multiplying one kind and lessening another, without any increase of the sum total?

28. Whether arbitrary changing the denomination of coin be not a public cheat?

29. What makes a wealthy people? Whether mines of gold and silver are capable of doing this? And whether the negroes, amidst the gold sands of Afric, are not poor and destitute?

30. Whether there be any virtue in gold or silver, other than as they set people at work, or create industry?

31. Whether it be not the opinion or will of the people, exciting them to industry, that truly enricheth a nation? And whether this doth not principally depend on the means for counting, transferring, and preserving power, that is, property of all kinds?

32. Whether if there was no silver or gold in the kingdom, our trade might not, nevertheless, supply bills of exchange,

sufficient to answer the demands of absentees in England or elsewhere?

33. Whether current bank-notes may not be deemed money? And whether they are not actually the greater part of the money of this kingdom?

34. Provided the wheels move, whether it is not the same thing, as to the effect of the machine, be this done by the force of wind, or water, or animals?

35. Whether power to command the industry of others be not real wealth? And whether money be not in truth tickets or tokens for conveying and recording such power, and whether it be of great consequence what materials the tickets are made of?

36. Whether trade, either foreign or domestic, be in truth any more than this commerce of industry?

37. Whether to promote, transfer, and secure this commerce, and this property in human labour, or, in other words, this power, be not the sole means of enriching a people, and how far this may be done independently of gold and silver?

38. Whether it were not wrong to suppose land itself to be wealth? And whether the industry of the people is not first to be considered, as that which constitutes wealth, which makes even land and silver to be wealth, neither of which would have any value but as means and motives to industry?

39. Whether in the wastes of America a man might not possess twenty miles square of land, and yet want his dinner, or a coat to his back?

40. Whether a fertile land, and the industry of its inhabitants, would not prove inexhaustible funds of real wealth, be the counters for conveying and recording thereof what you will, paper, gold, or silver?

41. Whether a single hint be sufficient to overcome a prejudice? And whether even obvious truths will not sometimes bear repeating?

42. Whether, if human labour be the true source of wealth, it doth not follow that idleness should of all things be discouraged in a wise state?

43. Whether even gold, or silver, if they should lessen the industry of its inhabitants, would not be ruinous to a country? And whether Spain be not an instance of this?

44. Whether the opinion of men, and their industry consequent thereupon, be not the true wealth of Holland and not the silver supposed to be deposited in the bank at Amsterdam?

45. Whether there is in truth any such treasure lying dead? And whether it be of great consequence to the public that it should be real rather than notional?

46. Whether, in order to understand the true nature of wealth and commerce, it would not be right to consider a ship's crew cast upon a desert island, and by degrees forming themselves to business and civil life, while industry begot credit, and credit moved to industry?

47. Whether such men would not all set themselves to work? Whether they would not subsist by the mutual participation of each other's industry? Whether, when one man had in his way procured more than he could consume, he would not exchange his superfluities to supply his wants? Whether this must not produce credit? Whether, to facilitate these conveyances, to record and circulate this credit, they would not soon agree on certain tallies, tokens, tickets, or counters?

48. Whether reflection in the better sort might not soon remedy our evils? And whether our real defect be not a wrong way of thinking?

49. Whether it would not be an unhappy turn in our gentlemen, if they should take no more thought to create an interest to themselves in this or that county, or borough, than to promote the real interest of their country?

50. Whether if a man builds a house he doth not in the first place provide a plan which governs his work? And shall the public act without an end, a view, a plan?

51. Whether by how much the less particular folk think for themselves, the public be not so much the more obliged to think for them?

52. Whether small gains be not the way to great profit? And if our tradesmen are beggars, whether they may not thank themselves for it?

53. Whether some way might not be found for making criminals useful in public works, instead of sending them either to America, or to the other world?

54. Whether we may not, as well as other nations, contrive

employment for them? And whether servitude, chains, and hard labour, for a term of years, would not be a more discouraging, as well as a more adequate punishment for felons than even death itself?

55. Whether there are not such things in Holland as bettering houses for bringing young gentlemen to order? And whether such an institution would be useless among us?

56. Whether it be true that the poor in Holland have no resource but their own labour, and yet there are no beggars in their streets?

57. Whether he whose luxury consumeth foreign products, and whose industry produceth nothing domestic to exchange for them, is not so far forth injurious to his country?

58. Whether necessity is not to be hearkened to before convenience, and convenience before luxury?

59. Whether to provide plentifully for the poor be not feeding the root, the substance whereof will shoot upwards into the branches, and cause the top to flourish?

60. Whether there be any instance of a state wherein the people, living neatly and plentifully, did not aspire to wealth?

61. Whether nastiness and beggary do not, on the contrary, extinguish all such ambition, making men listless, hopeless, and slothful?

62. Whether a country inhabited by a people well fed, clothed, and lodged would not become every day more populous? And whether a numerous stock of people in such circumstances would not constitute a flourishing nation? and how far the product of our own country may suffice for the compassing this end?

63. Whether a people who had provided themselves with the necessaries of life in good plenty would not soon extend their industry to new arts and new branches of commerce?

64. Whether those same manufactures which England imports from other countries may not be admitted from Ireland? And, if so, whether lace, carpets, and tapestry, three considerable articles of English importation, might not find encouragement in Ireland? And whether an academy for design might not greatly conduce to the perfecting those manufactures among us?

65. Whether France and Flanders could have drawn so much

money from England for figured silks, lace, and tapestry, if they had not had academies for designing?

66. Whether, when a room was once prepared, and models in plaster of Paris, the annual expense of such an academy need stand the public in above two hundred pounds a year?

67. Whether our linen-manufacture would not find the benefit of this institution? And whether there be anything that makes us fall short of the Dutch in damasks, diapers, and printed linen, but our ignorance in design?

68. Whether those who may slight this affair as notional have sufficiently considered the extensive use of the art of design, and its influence in most trades and manufactures, wherein the forms of things are often more regarded than the materials[2]?

69. Whether there be any art sooner learned than that of making carpets? And whether our women, with little time and pains, may not make more beautiful carpets than those imported from Turkey? And whether this branch of the woollen manufacture be not open to us?

70. Whether human industry can produce, from such cheap materials, a manufacture of so great value, by any other art, as by those of sculpture and painting?

71. Whether pictures and statues are not in fact so much treasure? And whether Rome and Florence would not be poor towns without them?

72. Whether they do not bring ready money as well as jewels? Whether in Italy debts are not paid, and children portioned with them, as with gold and silver?

73. Whether it would not be more prudent, to strike out and exert ourselves in permitted branches of trade, than to fold our hands, and repine that we are not allowed the woollen?

74. Whether it be true that two millions are yearly expended by England in foreign lace and linen?

75. Whether immense sums are not drawn yearly into the Northern countries, for supplying the British navy with hempen manufactures?

76. Whether there be anything more profitable than hemp? And whether there should not be greater premiums for encouraging

[2] [Since the first publication of this Query, the Art of Design seems to be more considered and countenanced among us.]—AUTHOR.

our hempen trade? What advantages may not Great Britain make of a country where land and labour are so cheap?

77. Whether Ireland alone might not raise hemp sufficient for the British navy? And whether it would not be vain to expect this from the British Colonies in America, where hands are so scarce, and labour so excessively dear?

78. Whether, if our own people want will or capacity for such an attempt, it might not be worth while for some undertaking spirits in England to make settlements, and raise hemp in the counties of Clare and Limerick, than which, perhaps, there is not fitter land in the world for that purpose? And whether both nations would not find their advantage therein?

79. Whether if all the idle hands in this kingdom were employed on hemp and flax, we might not find sufficient vent for these manufactures?

80. How far it may be in our own power to better our affairs, without interfering with our neighbours?

81. Whether the prohibition of our woollen trade ought not naturally to put us on other methods which give no jealousy?

82. Whether paper be not a valuable article of commerce? And whether it be not true that one single bookseller in London yearly expended above four thousand pounds in that foreign commodity?

83. How it comes to pass that the Venetians and Genoese, who wear so much less linen, and so much worse than we do, should yet make very good paper, and in great quantity, while we make very little?

84. How long it will be before my countrymen find out that it is worth while to spend a penny in order to get a groat?

85. If all the land were tilled that is fit for tillage, and all that sowed with hemp and flax that is fit for raising them, whether we should have much sheep-walk beyond what was sufficient to supply the necessities of the kingdom?

86. Whether other countries have not flourished without the woollen-trade?

87. Whether it be not a sure sign, or effect of a country's thriving, to see it well cultivated and full of inhabitants? And, if so, whether a great quantity of sheep-walk be not ruinous to a country, rendering it waste and thinly inhabited?

88. Whether the employing so much of our land under sheep be not in fact an Irish blunder?

89. Whether our hankering after our woollen-trade be not the true and only reason which hath created a jealousy in England towards Ireland? And whether anything can hurt us more than such jealousy?

90. Whether it be not the true interest of both nations to become one people? And whether either be sufficiently apprised of this?

91. Whether the upper part of this people are not truly English, by blood, language, religion, manners, inclination, and interest?

92. Whether we are not as much Englishmen as the children of old Romans, born in Britain, were still Romans?

93. Whether it be not our true interest, not to interfere with them; and, in every other case, whether it be not their true interest to befriend us?

94. Whether a mint in Ireland might not be of great convenience to the kingdom; and whether it could be attended with any possible inconvenience to Great Britain? And whether there were not mints in Naples and in Sicily, when those kingdoms were provinces to Spain, or the house of Austria?

95. Whether anything can be more ridiculous than for the north of Ireland to be jealous of a linen manufacture in the south?

96. Whether the county of Tipperary be not much better land than the county of Armagh; and yet whether the latter is not much better improved and inhabited than the former?

97. Whether every landlord in the kingdom doth not know the cause of this? And yet how few are the better for such their knowledge?

98. Whether large farms under few hands, or small ones under many are likely to be made most of? And whether flax and tillage do not naturally multiply hands, and divide lands into small holdings, and well-improved?

99. Whether, as our exports are lessened, we ought not to lessen our imports? And whether these will not be lessened as our demands, and these as our wants, and these as our customs or fashions? Of how great consequence therefore are fashions to the public?

100. Whether it would not be more reasonable to mend our state than complain of it; and how far this may be in our own power?

101. What the nation gains by those who live in Ireland upon the produce of foreign countries?

102. How far the vanity of our ladies in dressing, and of our gentlemen in drinking, contribute to the general misery of the people?

103. Whether nations, as wise and opulent as ours, have not made sumptuary laws; and what hinders us from doing the same?

104. Whether those who drink foreign liquors, and deck themselves and their families with foreign ornaments, are not so far forth to be reckoned absentees?

105. Whether, as our trade is limited, we ought not to limit our expenses; and whether this be not the natural and obvious remedy?

106. Whether the dirt, and famine, and nakedness of the bulk of our people might not be remedied, even although we had no foreign trade? And whether this should not be our first care; and whether, if this were once provided for, the conveniences of the rich would not soon follow?

107. Whether comfortable living doth not produce wants, and wants industry, and industry wealth?

108. Whether there is not a great difference between Holland and Ireland? And whether foreign commerce, without which the one could not subsist, be so necessary for the other?

109. Might we not put a hand to the plough, or the spade, although we had no foreign commerce?

110. Whether the exigencies of nature are not to be answered by industry on our own soil? And how far the conveniences and comforts of life may be procured, by a domestic commerce between the several parts of this kingdom?

111. Whether the women may not sew, spin, weave, embroider, sufficiently for the embellishment of their persons, and even enough to raise envy in each other, without being beholden to foreign countries?

112. Suppose the bulk of our inhabitants had shoes to their feet, clothes to their backs, and beef in their bellies, might not such a

state be eligible for the public, even though the squires were condemned to drink ale and cider?

113. Whether, if drunkenness be a necessary evil, men may not as well drink the growth of their own country?

114. Whether a nation within itself might not have real wealth, sufficient to give its inhabitants power and distinction, without the help of gold and silver?

115. Whether, if the arts of sculpture and painting were encouraged among us, we might not furnish our houses in a much nobler manner with our own manufactures?

116. Whether we have not, or may not have, all the necessary materials for building at home?

117. Whether tiles and plaster may not supply the place of Norway fir for flooring and wainscot?

118. Whether plaster be not warmer, as well as more secure, than deal? And whether a modern fashionable house, lined with fir, daubed over with oil and paint, be not like a fire-ship, ready to be lighted up by all accidents?

119. Whether larger houses, better built and furnished, a greater train of servants, the difference with regard to equipage and table between finer and coarser, more and less elegant, may not be sufficient to feed a reasonable share of vanity, or support all proper distinctions? And whether all these may not be procured by domestic industry out of the four elements, without ransacking the four quarters of the globe?

120. Whether anything is a nobler ornament, in the eye of the world, than an Italian palace, that is, stone and mortar skilfully put together, and adorned with sculpture and painting; and whether this may not be compassed without foreign trade?

121. Whether an expense in gardens and plantations would not be an elegant distinction for the rich, a domestic magnificence, employing many hands within, and drawing nothing from abroad?

122. Whether the apology which is made for foreign luxury in England, to wit, that they could not carry on their trade without imports as well as exports, will hold in Ireland?

123. Whether one may not be allowed to conceive and suppose a society, or nation of human creatures, clad in woollen cloths and stuffs, eating good bread, beef, and mutton, poultry, and fish,

in great plenty, drinking ale, mead, and cider, inhabiting decent houses built of brick and marble, taking their pleasure in fair parks and gardens, depending on no foreign imports either for food or raiment? And whether such people ought much to be pitied?

124. Whether Ireland be not as well qualified for such a state as any nation under the sun?

125. Whether in such a state the inhabitants may not contrive to pass the twenty-fours with tolerable ease and cheerfulness? And whether any people upon earth can do more?

126. Whether they may not eat, drink, play, dress, visit, sleep in good beds, sit by good fires, build, plant, raise a name, make estates, and spend them?

127. Whether, upon the whole, a domestic trade may not suffice in such a country as Ireland, to nourish and clothe its inhabitants, and provide them with the reasonable conveniences and even comforts of life?

128. Whether a general habit of living well would not produce numbers and industry; and whether, considering the tendency of human kind, the consequence thereof would not be foreign trade and riches, how unnecessary soever?

129. Whether, nevertheless, it be a crime to inquire how far we may do without foreign trade, and what would follow on such a supposition?

130. Whether the number and welfare of the subjects be not the true strength of the crown?

131. Whether in all public institutions there should not be an end proposed, which is to be the rule and limit of the means? Whether this end should not be the well-being of the whole? And whether, in order to this, the first step should not be to clothe and feed our people?

132. Whether there be upon earth any Christian or civilized people, so beggarly, wretched, and destitute as the common Irish?

133. Whether, nevertheless, there is any other people whose wants may be more easily supplied from home?

134. Whether, if there was a wall of brass a thousand cubits high round this kingdom, our natives might not nevertheless live cleanly and comfortably, till the land, and reap the fruits of it?

135. What should hinder us from exerting ourselves, using our hands and brains, doing something or other, man, woman, and child, like the other inhabitants of God's earth?

136. Be the restraining our trade well or ill advised in our neighbours, with respect to their own interest, yet whether it be not plainly ours to accommodate ourselves to it?

137. Whether it be not vain to think of persuading other people to see their interest, while we continue blind to our own?

138. Whether there be any other nation possessed of so much good land, and so many able hands to work it, which yet is beholden for bread to foreign countries?

139. Whether it be true that we import corn to the value of two hundred thousand pounds in some years [3]?

140. Whether we are not undone by fashions made for other people? And whether it be not madness in a poor nation to imitate a rich one?

141. Whether a woman of fashion ought not to be declared a public enemy?

142. Whether it be not certain that from the single town of Cork were exported, in one year, no less than one hundred and seven thousand one hundred and sixty-one barrels of beef; seven thousand three hundred and seventy-nine barrels of pork; thirteen thousand four hundred and sixty-one casks, and eighty-five thousand seven hundred and twenty-seven firkins of butter? And what hands were employed in this manufacture?

143. Whether a foreigner could imagine that one half of the people were starving, in a country which sent out such plenty of provisions?

144. Whether an Irish lady, set out with French silks and Flanders lace, may not be said to consume more beef and butter than a hundred of our labouring peasants?

145. Whether nine-tenths of our foreign trade be not carried on singly to support the article of vanity?

146. Whether it can be hoped that private persons will not indulge this folly, unless restrained by the public?

147. How vanity is maintained in other countries? Whether

[3] [Things are now better in respect of this particular, and some others, than they were when the *Querist* was first published.]—AUTHOR.

in Hungary, for instance, a proud nobility are not subsisted with small imports from abroad?

148. Whether there be a prouder people upon earth than the noble Venetians, although they all wear plain black clothes?

149. Whether a people are to be pitied that will not sacrifice their little particular vanities to the public good? And yet, whether each part would not except their own foible from this public sacrifice, the squire his bottle, the lady her lace?

150. Whether claret be not often drunk rather for vanity than for health, or pleasure?

151. Whether it be true that men of nice palates have been imposed on, by elder wine for French claret, and by mead for palm sack?

152. Do not Englishmen abroad purchase beer and cider at ten times the price of wine?

153. How many gentlemen are there in England of a thousand pound per annum who never drink wine in their own houses? Whether the same may be said of any in Ireland who have even one hundred pounds per annum?

154. What reason have our neighbours in England for discouraging French wines which may not hold with respect to us also?

155. How much of the necessary sustenance of our people is yearly exported for brandy?

156. Whether, if people must poison themselves, they had not better do it with their own growth?

157. If we imported neither claret from France, nor fir from Norway, what the nation would save by it?

158. When the root yieldeth insufficient nourishment, whether men do not top the tree to make the lower branches thrive?

159. Whether, if our ladies drank sage or balm tea out of Irish ware, it would be an insupportable national calamity?

160. Whether it be really true that such wine is best as most encourages drinking, *i. e.* that must be given in the largest dose to produce its effect? And whether this holds with regard to any other medicine?

161. Whether that trade should not be accounted most pernicious wherein the balance is most against us? And whether this be not the trade with France?

162. Whether it be not even madness to encourage trade with a nation that takes nothing of our manufacture?

163. Whether Ireland can hope to thrive if the major part of her patriots shall be found in the French interest?

164. Whether great plenty and variety of excellent wines are not to be had on the coasts of Italy and Sicily? And whether those countries would not take our commodities of linen, leather, butter, &c. in exchange for them?

165. Particularly, whether the *Vinum Mamertinum*, which grows on the mountains about Messina, a red generous wine, highly esteemed (if we may credit Pliny) by the ancient Romans, would not come cheap, and please the palates of our Islanders?

166. Why, if a bribe by the palate or the purse be in effect the same thing, they should not be alike infamous?

167. Whether the vanity and luxury of a few ought to stand in competition with the interest of a nation?

168. Whether national wants ought not to be the rule of trade? And whether the most pressing wants of the majority ought not to be first considered?

169. Whether it is possible the country should be well improved, while our beef is exported, and our labourers live upon potatoes?

170. If it be resolved that we cannot do without foreign trade, whether, at least, it may not be worth while to consider what branches thereof deserve to be entertained, and how far we may be able to carry it on under our present limitations?

171. What foreign imports may be necessary for clothing and feeding the families of persons not worth above one hundred pounds a year? And how many wealthier there are in the kingdom, and what proportion they bear to the other inhabitants?

172. Whether trade be not then on a right foot, when foreign commodities are imported in exchange only for domestic superfluities?

173. Whether the quantities of beef, butter, wool, and leather, exported from this island, can be reckoned the superfluities of a country, where there are so many natives naked and famished?

174. Whether it would not be wise so to order our trade as to

export manufactures rather than provisions, and of those such as employ most hands?

175. Whether she would not be a very vile matron, and justly thought either mad or foolish, that should give away the necessaries of life from her naked and famished children, in exchange for pearls to stick in her hair, and sweetmeats to please her own palate?

176. Whether a nation might not be considered as a family?

177. Whether the remark made by a Venetian ambassador to Cardinal Richelieu—'That France needed nothing to be rich and easy, but to know how to spend what she dissipates'—may not be of use also to other people?

178. Whether hungry cattle will not leap over bounds? And whether most men are not hungry in a country where expensive fashions obtain?

179. Whether there should not be published yearly schedules of our trade, containing an account of the imports and exports of the foregoing year?

180. Whether other methods may not be found for supplying the funds, besides the custom on things imported?

181. Whether any art or manufacture be so difficult as the making of good laws?

182. Whether our peers and gentlemen are born legislators? Or, whether that faculty be acquired by study and reflection?

183. Whether to comprehend the real interest of a people, and the means to procure it, do not imply some fund of knowledge, historical, moral, and political, with a faculty of reason improved by learning?

184. Whether every enemy to learning be not a Goth? And whether every such Goth among us be not an enemy to the country?

185. Whether, therefore, it would not be an omen of ill presage, a dreadful phenomenon in the land, if our great men should take it in their heads to deride learning and education?

186. Whether, on the contrary, it should not seem worth while to erect a mart of literature in this kingdom, under wise regulations and better discipline than in any other part of Europe? And whether this would not be an infallible means of drawing men and money into the kingdom?

187. Whether the governed be not too numerous for the governing part of our college? And whether it might not be expedient to convert thirty natives-places into twenty fellowships?

188. Whether, if we had two colleges, there might not spring a useful emulation between them? And whether it might not be contrived so to divide the fellows, scholars, and revenues, between both, as that no member should be a loser thereby?

189. Whether ten thousand pounds well laid out might not build a decent college, fit to contain two hundred persons; and whether the purchase-money of the chambers would not go a good way towards defraying the expense?

190. Where this college should be situated?

191. Whether, in imitation of the Jesuits at Paris, who admit Protestants to study in their colleges, it may not be right for us also to admit Roman Catholics into our college, without obliging them to attend chapel duties, or catechisms, or divinity lectures? And whether this might not keep money in the kingdom, and prevent the prejudices of a foreign education?

192. Whether it is possible a state should not thrive, whereof the lower part were industrious, and the upper wise?

193. Whether the collected wisdom of ages and nations be not found in books?

194. Whether Themistocles his art of making a little city, or a little people, become a great one be learned anywhere so well as in the writings of the ancients?

195. Whether a wise state hath any interest nearer heart than the education of youth?

196. Whether the mind, like soil, doth not by disuse grow stiff; and whether reasoning and study be not like stirring and dividing the glebe?

197. Whether an early habit of reflexion, although obtained by speculative sciences, may not have its use in practical affairs?

198. Whether even those parts of academical learning which are quite forgotten may not have improved and enriched the soil, like those vegetables which are raised, not for themselves, but ploughed in for a dressing of land?

199. Whether it was not an Irish professor who first opened the public schools at Oxford? Whether this island hath not been

anciently famous for learning? And whether at this day it hath any better chance of being considerable?

200. Whether we may not with better grace sit down and complain, when we have done all that lies in our power to help ourselves?

201. Whether the gentleman of estate hath a right to be idle; and whether he ought not to be the great promoter and director of industry among his tenants and neighbours?

202. Whether in the cantons of Switzerland all under thirty years of age are not excluded from their great councils?

203. Whether Homer's compendium of education,

Μύθων μὲν ῥητῆρ' ἔμεναι, πρηκτῆρά τε ἔργων.—Iliad ix.

would not be a good rule for modern educators of youth? And whether half the learning and study of these kingdoms is not useless, for want of a proper delivery and punctuation being taught in our schools and colleges?

204. Whether in any order a good building can be made of bad materials? Or whether any form of government can make a happy state out of bad individuals?

205. What was it that Solomon compared to a jewel of gold in a swine's snout?

206. Whether the public is more concerned in anything than in the procreation of able citizens?

207. Whether to the multiplying of human kind, it would not much conduce, if marriages were made with good-liking?

208. Whether, if women had no portions, we should then see so many unhappy and unfruitful marriages?

209. Whether the laws be not, according to Aristotle, a mind without appetite or passion? And consequently without respect of persons?

210. Suppose a rich man's son marries a poor man's daughter, suppose also that a poor man's daughter is deluded and debauched by the son of a rich man; which is most to be pitied?

211. Whether the punishment should be placed on the seduced or the seducer?

212. Whether a promise made before God and man in the most solemn manner ought to be violated?

213. Whether it was Plato's opinion that, 'for the good of the community, rich should marry with rich?'—*De Leg.* lib. iv.

214. Whether, as seed equally scattered produceth a goodly harvest, even so an equal distribution of wealth doth not cause a nation to flourish?

215. Whence is it that Barbs and Arabs are so good horses? And whether in those countries they are not exactly nice in admitting none but males of a good kind to their mares?

216. What effects would the same care produce in families?

217. Whether the real foundation for wealth must not be laid in the numbers, the frugality, and the industry of the people? And whether all attempts to enrich a nation by other means, as raising the coin, stock-jobbing, and such arts are not vain?

218. Whether a door ought not to be shut against all other methods of growing rich, save only by industry and merit? And whether wealth got otherwise would not be ruinous to the public?

219. Whether the abuse of banks and paper-money is a just objection against the use thereof? And whether such abuse might not easily be prevented?

220. Whether national banks are not found useful in Venice, Holland, and Hamburgh? And whether it is not possible to contrive one that may be useful also in Ireland?

221. Whether the banks of Venice and Amsterdam are not in the hands of the public?

222. Whether it may not be worth while to inform ourselves in the nature of those banks? And what reason can be assigned why Ireland should not reap the benefit of such public banks as well as other countries?

223. Whether a bank of national credit, supported by public funds and secured by Parliament, be a chimera or impossible thing? And if not, what would follow from the supposal of such a bank?

224. Whether the currency of a credit so well secured would not be of great advantage to our trade and manufactures?

225. Whether the notes of such public bank would not have a more general circulation than those of private banks, as being less subject to frauds and hazards?

226. Whether it be not agreed that paper hath in many respects the advantage above coin, as being of more dispatch in

payments, more easily transferred, preserved, and recovered when lost?

227. Whether, besides these advantages, there be not an evident necessity for circulating credit by paper, from the defect of coin in this kingdom?

228. Whether it be rightly remarked by some that, as banking brings no treasure into the kingdom like trade, private wealth must sink as the bank riseth? And whether whatever causeth industry to flourish and circulate may not be said to increase our treasure?

229. Whether the ruinous effects of the Mississippi, South Sea, and such schemes were not owing to an abuse of paper-money or credit, in making it a means for idleness and gaming, instead of a motive and help to industry?

230. Whether the rise of the bank of Amsterdam was not purely casual, for the sake of security and dispatch of payments? And whether the good effects thereof, in supplying the place of coin, and promoting a ready circulation of industry and commerce, may not be a lesson to us, to do that by design which others fell upon by chance?

231. Whether plenty of small cash be not absolutely necessary for keeping up a circulation among the people; that is, whether copper be not more necessary than gold?

232. Whether that which increaseth the stock of a nation be not a means of increasing its trade? And whether that which increaseth the current credit of a nation may not be said to increase its stock?

233. Whether the credit of the public funds be not a mine of gold to England? And whether any step that should lessen this credit ought not to be dreaded?

234. Whether such credit be not the principal advantage that England hath over France? I may add, over every other country in Europe?

235. Whether by this the public is not become possessed of the wealth of foreigners as well as natives? And whether England be not in some sort the treasury of Christendom?

236. Whether, as our current domestic credit grew, industry would not grow likewise; and if industry, our manufactures; and if these, our foreign credit?

237. Whether foreign demands may not be answered by our exports without drawing cash out of the kingdom?

238. Whether as industry increased, our manufactures would not flourish; and as these flourished, whether better returns would not be made from estates to their landlords, both within and without the kingdom?

239. Whether the sure way to supply people with tools and materials, and to set them at work, be not a free-circulation of money, whether silver or paper?

240. Whether in New England all trade and business are not as much at a stand, upon a scarcity of paper-money, as with us from the want of specie?

241. Whether it be certain that the quantity of silver in the bank of Amsterdam be greater now than at first; but whether it be not certain that there is a greater circulation of industry and extent of trade, more people, ships, houses, and commodities of all sorts, more power by sea and land?

242. Whether money, lying dead in the bank of Amsterdam, would not be as useless as in the mine?

243. Whether our visible security in land could be doubted? And whether there be anything like this in the bank of Amsterdam?

244. Whether it be just to apprehend danger from trusting a national bank with power to extend its credit, to circulate notes which it shall be felony to counterfeit, to receive goods on loans, to purchase lands, to sell also or alienate them, and to deal in bills of exchange; when these powers are no other than have been trusted for many years with the bank of England, although in truth but a private bank?

245. Whether the objection from monopolies and an overgrowth of power, which are made against private banks, can possibly hold against a national one?

246. Whether the evil effects which of late years have attended paper-money and credit in Europe did not spring from subscriptions, shares, dividends, and stock-jobbing?

247. Whether the great evils attending paper-money in the British Plantations of America have not sprung from the over-rating their lands, and issuing paper without discretion, and from the legislators breaking their own rules in favour of themselves,

thus sacrificing the public to their own private benefit? And whether a little sense and honesty might not easily prevent all such inconveniences?

248. Whether the subject of free-thinking in religion be not exhausted? And whether it be not high time for our Free-thinkers to turn their thoughts to the improvement of their country?

249. Whether it must not be ruinous for a nation to sit down to game, be it with silver or with paper?

250. Whether, therefore, the circulating paper, in the late ruinous schemes of France and England, was the true evil, and not rather the circulating thereof without industry? And whether the bank of Amsterdam, where industry had been for so many years subsisted and circulated by transfers on paper, doth not clearly decide this point?

251. Whether there are not to be seen in America fair towns, wherein the people are well lodged, fed, and clothed, without a beggar in their streets, although there be not one grain of gold or silver current among them?

252. Whether these people do not exercise all arts and trades, build ships and navigate them to all parts of the world, purchase lands, till and reap the fruits of them, buy and sell, educate and provide for their children? Whether they do not even indulge themselves in foreign vanities?

253. Whether, whatever inconveniences those people may have incurred from not observing either rules or bounds in their paper-money, yet it be not certain that they are in a more flourishing condition, have larger and better built towns, more plenty, more industry, more arts and civility, and a more extensive commerce, than when they had gold and silver current among them?

254. Whether a view of the ruinous effects of absurd schemes and credit mismanaged, so as to produce gaming and madness instead of industry, can be any just objection against a national bank calculated purely to promote industry?

255. Whether a scheme for the welfare of this nation should not take in the whole inhabitants? And whether it be not a vain attempt, to project the flourishing of our Protestant gentry, exclusive of the bulk of the natives?

256. Whether an oath, testifying allegiance to the king, and disclaiming the pope's authority in temporals, may not be justly

required of the Roman Catholics? And whether, in common prudence or policy, any priest should be tolerated who refuseth to take it?

257. Whether there is any such thing as a body of inhabitants, in any Roman Catholic country under the sun, that profess an absolute submission to the pope's orders in matters of an indifferent nature, or that in such points do not think it their duty to obey the civil government?

258. Whether since the peace of Utrecht, mass was not celebrated, and the sacraments administered in divers dioceses of Sicily, notwithstanding the pope's interdict?

259. Whether a sum which would go but a little way towards erecting hospitals for maintaining and educating the children of the native Irish might not go far in binding them out apprentices to Protestant masters, for husbandry, useful trades, and the service of families?

260. Whether there be any instance of a people's being converted in a Christian sense, otherwise than by preaching to them and instructing them in their own language?

261. Whether catechists in the Irish tongue may not easily be procured and subsisted? And whether this would not be the most practicable means for converting the natives?

262. Whether it be not of great advantage to the Church of Rome, that she hath clergy suited to all ranks of men, in gradual subordination from cardinals down to mendicants?

263. Whether her numerous poor clergy are not very useful in missions, and of much influence with the people?

264. Whether, in defect of able missionaries, persons conversant in low life, and speaking the Irish tongue, if well instructed in the first principles of religion, and in the popish controversy, though for the rest on a level with the parish clerks, or the schoolmasters of charity-schools, may not be fit to mix with and bring over our poor illiterate natives to the Established Church? Whether it is not to be wished that some parts of our liturgy and homilies were publicly read in the Irish language? And whether, in these views, it may not be right to breed up some of the better sort of children in the charity-schools, and qualify them for missionaries, catechists, and readers?

265. Whether a squire possessed of land to the value of a thousand pounds per annum, or a merchant worth twenty thousand pounds in cash, would have most power to do good or evil upon any emergency? And whether the suffering Roman Catholics to purchase forfeited lands would not be good policy, as tending to unite their interest with that of the government?

266. Whether the sea-ports of Galway, Limerick, Cork, and Waterford are not to be looked on as keys of this kingdom? And whether the merchants are not possessed of these keys; and who are the most numerous merchants in those cities?

267. Whether a merchant cannot more speedily raise a sum, more easily conceal or transfer his effects, and engage in any desperate design with more safety, than a landed man, whose estate is a pledge for his behaviour?

268. Whether a wealthy merchant bears not great sway among the populace of a trading city? And whether power be not ultimately lodged in the people?

269. Whether, as others have supposed an Atlantis or Utopia, we also may not suppose an Hyperborean island inhabited by reasonable creatures?

270. Whether an indifferent person, who looks into all hands, may not be a better judge of the game than a party who sees only his own?

271. Whether there be any country in Christendom more capable of improvement than Ireland?

272. Whether we are not as far before other nations with respect to natural advantages, as we are behind them with respect to arts and industry?

273. Whether we do not live in a most fertile soil and temperate climate, and yet whether our people in general do not feel great want and misery?

274. Whether my countrymen are not readier at finding excuses than remedies?

275. Whether the wealth and prosperity of our country do not hang by a hair, the probity of one banker, the caution of another, and the lives of all?

276. Whether we have not been sufficiently admonished of this by some late events?

277. Whether a national bank would not at once secure our

properties, put an end to usury, facilitate commerce, supply the want of coin, and produce ready payments in all parts of the kingdom?

278. Whether the use or nature of money, which all men so eagerly pursue, be yet sufficiently understood or considered by all?

279. What doth Aristotle mean by saying—

Λῆρος εἶναι δοκεῖ τὸ νόμισμα.—*De Repub.* lib. ix. 9?

280. Whether mankind are not governed by imitation rather than by reason?

281. Whether there be not a measure or limit, within which gold and silver are useful, and beyond which they may be hurtful?

282. Whether that measure be not the circulating of industry?

283. Whether a discovery of the richest gold mine that ever was, in the heart of the kingdom, would be a real advantage to us?

284. Whether it would not tempt foreigners to prey upon us?

285. Whether it would not render us a lazy, proud, and dastardly people?

286. Whether every man who had money enough would not be a gentleman? And whether a nation of gentlemen would not be a wretched nation?

287. Whether all things would not bear a high price? And whether men would not increase their fortunes without being the better for it?

288. Whether the same evils would be apprehended from paper-money under an honest and thrifty regulation?

289. Whether, therefore, a national bank would not be more beneficial than even a mine of gold?

290. Whether without private banks what little business and industry there is would not stagnate? But whether it be not a mighty privilege for a private person to be able to create a hundred pounds with a dash of his pen?

291. Whether the wise state of Venice was not the first that conceived the advantage of a national bank?

292. Whether the great exactness and integrity with which this bank is managed be not the chief support of that republic?

293. Whether the bank of Amsterdam was not begun about one

hundred and thirty years ago, and whether at this day its stock be not conceived to amount to three thousand tons of gold, or thirty millions sterling?

294. Whether all payments of contracts for goods in gross, and letters of exchange must not be made by transfers in the bank-books, provided the sum exceed three hundred florins?

295. Whether it be not owing to this bank that the city of Amsterdam, without the least confusion, hazard, or trouble, maintains and every day promotes so general and quick a circulation of industry?

296. Whether it be not the greatest help and spur to commerce that property can be so readily conveyed and so well secured by a *compte en banc*, that is, by only writing one man's name for another's in the bank-book?

297. Whether, at the beginning of the last century, those who had lent money to the public during the war with Spain were not satisfied by the sole expedient of placing their names in a *compte en banc*, with liberty to transfer their claims?

298. Whether the example of those easy transfers in the *compte en banc*, thus casually erected, did not tempt other men to become creditors to the public, in order to profit by the same secure and expeditious method of keeping and transferring their wealth?

299. Whether this *compte en banc* hath not proved better than a mine of gold to Amsterdam?

300. Whether that city may not be said to owe her greatness to the unpromising accident of her having been in debt more than she was able to pay?

301. Whether it be known that any state from such small beginnings, in so short a time, ever grew to so great wealth and power as the province of Holland hath done; and whether the bank of Amsterdam hath not been the real cause of such extraordinary growth?

302. Whether the success of those public banks in Venice, Amsterdam and Hamburgh would not naturally produce in other states an inclination to the same methods?

303. Whether it be possible for a national bank to subsist and maintain its credit under a French Government?

304. Whether our natural appetites, as well as powers, are not

limited to their respective ends and uses? But whether artificial appetites may not be infinite?

305. Whether the simple getting of money, or passing it from hand to hand without industry, be an object worthy of a wise government?

306. Whether, if money be considered as an end, the appetite thereof be not infinite? But whether the ends of money itself be not bounded?

307. Whether the total sum of all other powers, be it of enjoyment or action, which belong to a man, or to all mankind together, is not in truth a very narrow and limited quantity? But whether fancy is not boundless?

308. Whether this capricious tyrant, which usurps the place of reason, doth not most cruelly torment and delude those poor men, the usurers, stockjobbers, and projectors, of content to themselves from heaping up riches, that is, from gathering counters, from multiplying figures, from enlarging denominations, without knowing what they would be at, and without having a proper regard for the use, or end, or nature of things?

309. Whether the *ignis fatuus* of fancy doth not kindle immoderate desires, and lead men into endless pursuits and wild labyrinths?

310. Whether counters be not referred to other things, which, so long as they keep pace and proportion with the counters, it must be owned the counters are useful; but whether beyond that to value or covet counters be not direct folly?

311. Whether the public aim ought not to be, that men's industry should supply their present wants, and the overplus be converted into a stock of power?

312. Whether the better this power is secured, and the more easily it is transferred, industry be not so much the more encouraged?

313. Whether money, more than is expedient for those purposes, be not upon the whole hurtful rather than beneficial to a state?

314. Whether the promoting of industry should not be always in view, as the true and sole end, the rule and measure, of a national bank? And whether all deviations from that object should not be carefully avoided?

315. Whether it may not be useful, for supplying manufactures and trade with stock, for regulating exchange, for quickening commerce, and for putting spirit into the people?

316. Whether we are sufficiently sensible of the peculiar security there is in having a bank that consists of land and paper, one of which cannot be exported, and the other is in no danger of being exported?

317. Whether it be not delightful to complain? And whether there be not many who had rather utter their complaints than redress their evils?

318. Whether, if 'the crown of the wise be their riches[1],' we are not the foolishest people in Christendom?

319. Whether we have not all the while great civil as well as natural advantages?

320. Whether there be any people who have more leisure to cultivate the arts of peace, and study the public weal?

321. Whether other nations who enjoy any share of freedom, and have great objects in view, be not unavoidably embarrassed and distracted by factions? But whether we do not divide upon trifles, and whether our parties are not a burlesque upon politics?

322. Whether it be not an advantage that we are not embroiled in foreign affairs, that we hold not the balance of Europe, that we are protected by other fleets and armies, that it is the true interest of a powerful people, from whom we are descended, to guard us on all sides?

323. Whether England doth not really love us and wish well to us, as bone of her bone, and flesh of her flesh? And whether it be not our part to cultivate this love and affection all manner of ways?

324. What sea-ports or foreign trade have the Swisses; and yet how warm are those people, and how well provided?

325. Whether there may not be found a people who so contrive as to be impoverished by their trade? And whether we are not that people?

326. Whether it would not be better for this island, if all our fine folk of both sexes were shipped off, to remain in foreign countries, rather than that they should spend their estates at

[1] [Prov. xiv. 24.]—Author.

home in foreign luxury, and spread the contagion thereof through their native land?

327. Whether our gentry understand or have a notion of magnificence, and whether for want thereof they do not affect very wretched distinctions?

328. Whether there be not an art or skill in governing human pride, so as to render it subservient to the public aim?

329. Whether the great and general aim of the public should not be to employ the people?

330. What right an eldest son hath to the worst education?

331. Whether men's counsels are not the result of their knowledge and their principles?

332. Whether there be not labour of the brains as well as of the hands, and whether the former is beneath a gentleman?

333. Whether the public be more interested to protect the property acquired by mere birth than that which is the immediate fruit of learning and virtue?

334. Whether it would not be a poor and ill judged project to attempt to promote the good of the community, by invading the rights of one part thereof, or of one particular order of men?

335. Whether there be a more wretched, and at the same time a more unpitied case, than for men to make precedents for their own undoing?

336. Whether to determine about the rights and properties of men by other rules than the law be not dangerous?

337. Whether those men who move the corner-stones of a constitution may not pull an old house on their own heads?

338. Whether there be not two general methods whereby men become sharers in the national stock of wealth or power, industry and inheritance? And whether it would be wise in a civil society to lessen that share which is allotted to merit and industry?

339. Whether all ways of spending a fortune be of equal benefit to the public, and what sort of men are aptest to run into an improper expense?

340. If the revenues allotted for the encouragement of religion and learning were made hereditary in the hands of a dozen lay lords and as many overgrown commoners, whether the public would be much the better for it?

341. Whether the Church's patrimony belongs to one tribe alone; and whether every man's son, brother, or himself, may not, if he please, be qualified to share therein?

342. What is there in the clergy to create a jealousy in the public? Or what would the public lose by it, if every squire in the land wore a black coat, said his prayers, and was obliged to reside?

343. Whether there be anything perfect under the sun? And whether it be not with the world as with a particular state, and with a state or body politic as with the human body, which lives and moves under various indispositions, perfect health being seldom or never to be found?

344. Whether, nevertheless, men should not in all things aim at perfection? And, therefore, whether any wise and good man would be against applying remedies? But whether it is not natural to wish for a benevolent physician?

345. Whether the public happiness be not proposed by the legislature, and whether such happiness doth not contain that of the individuals?

346. Whether, therefore, a legislator should be content with a vulgar share of knowledge? Whether he should not be a person of reflection and thought, who hath made it his study to understand the true nature and interest of mankind, how to guide men's humours and passions, how to incite their active powers, how to make their several talents co-operate to the mutual benefit of each other, and the general good of the whole?

347. Whether it doth not follow that above all things a gentleman's care should be to keep his own faculties sound and entire?

348. Whether the natural phlegm of this island needs any additional stupifier?

349. Whether all spirituous liquors are not in truth opiates?

350. Whether our men of business are not generally very grave by fifty?

351. Whether all men have not faculties of mind or body which may be employed for the public benefit?

352. Whether the main point be not to multiply and employ our people?

353. Whether hearty food and warm clothing would not enable and encourage the lower sort to labour?

354. Whether, in such a soil as ours, if there was industry, there could be want?

355. Whether the way to make men industrious be not to let them taste the fruits of their industry? And whether the labouring ox should be muzzled?

356. Whether our landlords are to be told that industry and numbers would raise the value of their lands, or that one acre about the Tholsel is worth ten thousand acres in Connaught?

357. Whether our old native Irish are not the most indolent and supine people in Christendom?

358. Whether they are yet civilized, and whether their habitations and furniture are not more sordid than those of the savage Americans?

359. Whether it be not a sad circumstance to live among lazy beggars? And whether, on the other hand, it would not be delightful to live in a country swarming, like China, with busy people?

360. Whether we should not cast about, by all manner of means, to excite industry, and to remove whatever hinders it? And whether every one should not lend a helping hand?

361. Whether vanity itself should not be engaged in this good work? And whether it is not to be wished that the finding of employment for themselves and others were a fashionable distinction among the ladies?

362. Whether idleness be the mother or daughter of spleen?

363. Whether it may not be worth while to publish the conversation of Ischomachus and his wife in Xenophon, for the use of our ladies?

364. Whether it is true that there have been, upon a time, one hundred millions of people employed in China, without the woollen trade, or any foreign commerce?

365. Whether the natural inducements to sloth are not greater in the Mogul's country than in Ireland, and yet whether, in that suffocating and dispiriting climate, the Banyans are not all, men, women, and children, constantly employed?

366. Whether it be not true that the Great Mogul's subjects

might undersell us even in our own markets, and clothe our people with their stuffs and calicoes, if they were imported duty free?

367. Whether there can be a greater reproach on the leading men and the patriots of a country, than that the people should want employment? And whether methods may not be found to employ even the lame and the blind, the dumb, the deaf, and the maimed, in some or other branch of our manufactures?

368. Whether much may not be expected from a biennial consultation of so many wise men about the public good?

369. Whether a tax upon dirt would not be one way of encouraging industry?

370. Whether it would be a great hardship if every parish were obliged to find work for their poor?

371. Whether children especially should not be inured to labour betimes?

372. Whether there should be not erected, in each province, an hospital for orphans and foundlings, at the expense of old bachelors?

373. Whether it be true that in the Dutch workhouses things are so managed that a child four years old may earn its own livelihood?

374. What a folly is it to build fine houses, or establish lucrative posts and large incomes, under the notion of providing for the poor?

375. Whether the poor, grown up and in health, need any other provision but their own industry, under public inspection?

376. Whether the poor-tax in England hath lessened or increased the number of poor?

377. Whether workhouses should not be made at the least expense, with clay floors, and walls of rough stone, without plastering, ceiling, or glazing?

378. Whether it be an impossible attempt to set our people at work, or whether industry be a habit, which, like other habits, may by time and skill be introduced among any people?

379. Whether all manner of means should not be employed to possess the nation in general with an aversion and contempt for idleness and all idle folk?

380. Whether it would be a hardship on people destitute of all

things, if the public furnished them with necessaries which they should be obliged to earn by their labour?

381. Whether other nations have not found great benefit from the use of slaves in repairing high roads, making rivers navigable, draining bogs, erecting public buildings, bridges, and manufactories?

382. Whether temporary servitude would not be the best cure for idleness and beggary?

383. Whether the public hath not a right to employ those who cannot, or who will not find employment for themselves?

384. Whether all sturdy beggars should not be seized and made slaves to the public for a certain term of years?

385. Whether he who is chained in a jail or dungeon hath not, for the time, lost his liberty? And if so, whether temporary slavery be not already admitted among us?

386. Whether a state of servitude, wherein he should be well worked, fed, and clothed, would not be a preferment to such a fellow?

387. Whether criminals in the freest country may not forfeit their liberty, and repair the damage they have done the public by hard labour?

388. What the word servant signifies in the New Testament?

389. Whether the view of criminals chained in pairs and kept at hard labour would not be very edifying to the multitude?

390. Whether the want of such an institution be not plainly seen in England, where the disbelief of a future state hardeneth rogues against the fear of death, and where, through the great growth of robbers and housebreakers, it becomes every day more necessary?

391. Whether it be not easier to prevent than to remedy, and whether we should not profit by the example of others?

392. Whether felons are not often spared, and therefore encouraged, by the compassion of those who should prosecute them?

393. Whether many that would not take away the life of a thief may not nevertheless be willing to bring him to a more adequate punishment?

394. Whether the most indolent would be fond of idleness, if they regarded it as the sure road to hard labour?

395. Whether the industry of the lower part of our people doth not much depend on the expense of the upper?

396. What would be the consequence if our gentry affected to distinguish themselves by fine houses rather than fine clothes?

397. Whether any people in Europe are so meanly provided with houses and furniture, in proportion to their incomes, as the men of estates in Ireland?

398. Whether building would not peculiarly encourage all other arts in this kingdom?

399. Whether smiths, masons, bricklayers, plasterers, carpenters, joiners, tilers, plumbers, and glaziers would not all find employment if the humour of building prevailed?

400. Whether the ornaments and furniture of a good house do not employ a number of all sorts of artificers, in iron, wood, marble, brass, pewter, copper, wool, flax, and divers other materials?

401. Whether in buildings and gardens a great number of day-labourers do not find employment?

402. Whether by these means much of that sustenance and wealth of this nation which now goes to foreigners would not be kept at home, and nourish and circulate among our own people?

403. Whether, as industry produced good living, the number of hands and mouths would not be increased; and in proportion thereunto, whether there would not be every day more occasion for agriculture? And whether this article alone would not employ a world of people?

404. Whether such management would not equally provide for the magnificence of the rich, and the necessities of the poor?

405. Whether an expense in building and improvements doth not remain at home, pass to the heir, and adorn the public? And whether any of these things can be said of claret?

406. Whether fools do not make fashions, and wise men follow them?

407. Whether, for one who hurts his fortune by improvements, twenty do not ruin themselves by foreign luxury?

408. Whether in proportion as Ireland was improved and beautified by fine seats, the number of absentees would not decrease?

409. Whether he who employs men in buildings and manufactures doth not put life in the country, and whether the neighbourhood round him be not observed to thrive?

410. Whether money circulated on the landlord's own lands, and among his own tenants, doth not return into his own pocket?

411. Whether every squire that made his domain swarm with busy hands, like a bee-hive or ant-hill, would not serve his own interest, as well as that of his country?

412. Whether a gentleman who hath seen a little of the world, and observed how men live elsewhere, can contentedly sit down in a cold, damp, sordid habitation, in the midst of a bleak country, inhabited by thieves and beggars?

413. Whether, on the other hand, a handsome seat amidst well-improved lands, fair villages, and a thriving neighbourhood, may not invite a man to dwell on his own estate, and quit the life of an insignificant saunterer about town, for that of a useful country-gentleman?

414. Whether it would not be of use and ornament if the towns throughout this kingdom were provided with decent churches, townhouses, workhouses, market-places, and paved streets, with some order taken for cleanliness?

415. Whether, if each of these towns were addicted to some peculiar manufacture, we should not find that the employing many hands together on the same work was the way to perfect our workmen? And whether all these things might not soon be provided by a domestic industry, if money were not wanting?

416. Whether money could ever be wanting to the demands of industry, if we had a national bank?

417. Whether the fable of Hercules and the carter ever suited any nation like this nation of Ireland?

418. Whether it be not a new spectacle under the sun, to behold, in such a climate and such a soil, and under such a gentle government, so many roads untrodden, fields untilled, houses desolate, and hands unemployed?

419. Whether there is any country in Christendom, either kingdom or republic, depending or independent, free or enslaved, which may not afford us a useful lesson?

420. Whether the frugal Swisses have any other commodities

but their butter and cheese and a few cattle, for exportation; whether, nevertheless, the single canton of Berne hath not in her public treasury two millions sterling?

421. Whether that small town of Berne, with its scanty barren territory, in a mountainous corner, without sea-ports, without manufactures, without mines, be not rich by mere dint of frugality?

422. Whether the Swisses in general have not sumptuary laws, prohibiting the use of gold, jewels, silver, silk, and lace in their apparel, and indulging the women only to wear silk on festivals, weddings, and public solemnities?

423. Whether there be not two ways of growing rich, sparing and getting? But whether the lazy spendthrift must not be doubly poor?

424. Whether money circulating be not the life of industry; and whether the want thereof doth not render a state gouty and inactive?

425. But whether, if we had a national bank, and our present cash (small as it is) were put into the most convenient shape, men should hear any public complaints for want of money?

426. Whether all circulation be not alike a circulation of credit, whatsoever medium (metal or paper) is employed, and whether gold be any more than credit for so much power?

427. Whether the wealth of the richest nations in Christendom doth not consist in paper vastly more than in gold and silver?

428. Whether Lord Clarendon doth not aver of his own knowledge, that the Prince of Orange, with the best credit, and the assistance of the richest men in Amsterdam, was above ten days endeavouring to raise 20,000*l.* in specie, without being able to raise half the sum in all that time? (See Clarendon's *History*, b. xii.)

429. Supposing there had been hitherto no such thing as a bank, and the question were now first proposed, whether it would be safer to circulate unlimited bills in a private credit, or bills to a limited value on the public credit of the community, what would men think?

430. Whether the maxim, 'What is everybody's business is nobody's,' prevails in any country under the sun more than in Ireland?

431. Whether the united stock of a nation be not the best security? And whether anything but the ruin of the state can produce a national bankruptcy?

432. Whether the total sum of the public treasure, power, and wisdom, all co-operating, be not most likely to establish a bank of credit, sufficient to answer the ends, relieve the wants, and satisfy the scruples of all people?

433. Whether London is not to be considered as the metropolis of Ireland? And whether our wealth (such as it is) doth not circulate through London and throughout England, as freely as that of any part of his Majesty's dominions?

434. Whether therefore it be not evidently the interest of the people of England to encourage rather than to oppose a national bank in this kingdom, as well as every other means for advancing our wealth which shall not impair their own?

435. Whether it is not our interest to be useful to them rather than rival them; and whether in that case we may not be sure of their good offices?

436. Whether we can propose to thrive so long as we entertain a wrongheaded distrust of England?

437. Whether, as a national bank would increase our industry, and that our wealth, England may not be a proportionable gainer; and whether we should not consider the gains of our mother-country as some accession to our own?

438. Whether there be any difficulty in comprehending that the whole wealth of the nation is in truth the stock of a national bank? And whether any more than the right comprehension of this be necessary to make all men easy with regard to its credit?

439. Whether the prejudices about gold and silver are not strong, but whether they are not still prejudices?

440. Whether paper doth not by its stamp and signature acquire a local value, and become as precious and as scarce as gold? And whether it be not much fitter to circulate large sums, and therefore preferable to gold?

441. Whether it doth not much import to have a right conception of money? And whether its true and just idea be not that of a ticket, entitling to power, and fitted to record and transfer such power?

442. Though the bank of Amsterdam doth very rarely, if at all, pay out money, yet whether every man possessed of specie be not ready to convert it into paper, and act as cashier to the bank? And whether, from the same motive, every monied man throughout this kingdom would not be cashier to our national bank?

443. Whether we may not obtain that as friends which it is in vain to hope for as rivals?

444. Whether in every instance by which we prejudice England, we do not in a greater degree prejudice ourselves?

445. Whether in the rude original of society the first step was not the exchanging of commodities; the next a substituting of metals by weight as the common medium of circulation; after this the making use of coin; lastly, a further refinement by the use of paper with proper marks and signatures? And whether this, as it is the last, so it be not the greatest improvement?

446. Whether we are not in fact the only people who may be said to starve in the midst of plenty?

447. Whether there can be a worse sign than that people should quit their country for a livelihood? Though men often leave their country for health, or pleasure, or riches, yet to leave it merely for a livelihood, whether this be not exceeding bad, and sheweth some peculiar mismanagement?

448. Whether, in order to redress our evils, artificial helps are not most wanted in a land where industry is most against the natural grain of the people?

449. Whether, although the prepossessions about gold and silver have taken deep root, yet the example of our Colonies in America doth not make it as plain as day-light that they are not so necessary to the wealth of a nation as the vulgar of all ranks imagine?

450. Whether it be not evident that we may maintain a much greater inward and outward commerce, and be five times richer than we are, nay, and our bills abroad be of far greater credit, though we had not one ounce of gold or silver in the whole island?

451. Whether wrongheaded maxims, customs, and fashions are

not sufficient to destroy any people which hath so few resources as the inhabitants of Ireland?

452. Whether it would not be a horrible thing to see our matrons make dress and play their chief concern?

453. Whether our ladies might not as well endow monasteries as wear Flanders lace? And whether it be not true that Popish nuns are maintained by Protestant contributions?

454. Whether England, which hath a free trade, whatever she remits for foreign luxury with one hand, doth not with the other receive much more from abroad? Whether, nevertheless, this nation would not be a gainer, if our women would content themselves with the same moderation in point of expense as the English ladies?

455. But whether it be not a notorious truth that our Irish ladies are on a foot, as to dress, with those of five times their fortune in England?

456. Whether it be not even certain that the matrons of this forlorn country send out a greater proportion of its wealth, for fine apparel, than any other females on the whole surface of this terraqueous globe?

457. Whether the expense, great as it is, be the greatest evil; but whether this folly may not produce many other follies, an entire derangement of domestic life, absurd manners, neglect of duties, bad mothers, a general corruption in both sexes?

458. Whether the first beginning of expedients do not always meet with prejudices? And whether even the prejudices of a people ought not to be respected?

459. Whether a national bank be not the true philosopher's stone in a state?

460. Whether all regulations of coin should not be made with a view to encourage industry, and a circulation of commerce, throughout the kingdom?

461. Whether to oil the wheels of commerce be not a common benefit? And whether this be not done by avoiding fractions and multiplying small silver?

462. Whether, all things considered, a general raising the value of gold and silver be not so far from bringing greater quantities thereof into the kingdom that it would produce a direct contrary effect, inasmuch as less, in that case, would serve, and therefore

less be wanted? And whether men do not import a commodity in proportion to the demand or want of it?

463. Whether the lowering of our gold would not create a fever in the state? And whether a fever be not sometimes a cure, but whether it be not the last cure a man would choose?

464. Whether raising the value of a particular species will not tend to multiply such species, and to lessen others in proportion thereunto? And whether a much less quantity of cash in silver would not, in reality, enrich the nation more than a much greater in gold?

465. Whether, *cæteris paribus*, it be not true that the prices of things increase as the quantity of money increaseth, and are diminished as that is diminished? And whether, by the quantity of money, is not to be understood the amount of the denominations, all contracts being nominal for pounds, shillings, and pence, and not for weights of gold or silver?

466. Whether our exports do not consist of such necessaries as other countries cannot well be without?

467. Whether upon the circulation of a national bank more land would not be tilled, more hands employed, and consequently more commodities exported?

468. Whether silver and small money be not that which circulates the quickest, and passeth through all hands, on the road, in the market, at the shop?

469. Whether, all things considered, it would not be better for a kingdom that its cash consisted of half a million in small silver, than of five times that sum in gold?

470. Whether there be not every day five hundred lesser payments made for one that requires gold?

471. Whether Spain, where gold bears the highest value, be not the laziest, and China, where it bears the lowest, be not the most industrious country in the known world?

472. Whether it be not evidently the interest of every state, that its money should rather circulate than stagnate?

473. Whether the principal use of cash be not its ready passing from hand to hand, to answer common occasions of the common people, and whether common occasions of all sorts of people are not small ones?

474. Whether business at fairs and markets is not often

at a stand and often hindered, even though the seller hath his commodities at hand, and the purchaser his gold, for want of change?

475. As wealth is really power, and coin a ticket conveying power, whether those tickets which are the fittest for that use ought not to be preferred?

476. Whether those tickets which singly transfer small shares of power, and, being multiplied, large shares, are not fitter for common use than those which singly transfer large shares?

477. Whether the public is not more benefited by a shilling that circulates than a pound that lies dead?

478. Whether sixpence twice paid be not as good as a shilling once paid?

479. Whether the same shilling circulating in a village may not supply one man with bread, another with stockings, a third with a knife, a fourth with paper, a fifth with nails, and so answer many wants which must otherwise have remained unsatisfied?

480. Whether facilitating and quickening the circulation of power to supply wants be not the promoting of wealth and industry among the lower people? And whether upon this the wealth of the great doth not depend?

481. Whether, without the proper means of circulation, it be not vain to hope for thriving manufactures and a busy people?

482. Whether four pounds in small cash may not circulate and enliven an Irish market, which many four-pound pieces would permit to stagnate [5]?

483. Whether a man that could move nothing less than a hundred-pound weight would not be much at a loss to supply his wants; and whether it would not be better for him to be less strong and more active?

484. Whether the natural body can be in a state of health and vigour without a due circulation of the extremities, even in the fingers and toes? And whether the political body, any more than the natural, can thrive without a proportionable

[5] [In the year 1735, this country abounded with the large gold coins of Portugal, which, being over-rated, flowed in from all parts. But that evil is since remedied.]—AUTHOR.

circulation through the minutest and most inconsiderable parts thereof?

485. If we had a mint for coining only shillings, sixpences, and copper-money, whether the nation would not soon feel the good effects thereof?

486. Whether the greater waste by wearing of small coins would not be abundantly overbalanced by their usefulness?

487. Whether it be not the industry of common people that feeds the state, and whether it be possible to keep this industry alive without small money?

488. Whether the want of this be not a great bar to our employing the people in these manufactures which are open to us, and do not interfere with Great Britain?

489. Whether therefore such want doth not drive men into the lazy way of employing land under sheep-walk?

490. Whether the running of wool from Ireland can so effectually be prevented as by encouraging other business and manufactures among our people?

491. Whatever commodities Great Britain importeth which we might supply, whether it be not her real interest to import them from us rather than from any other people?

492. Whether the apprehension of many among us (who for that very reason stick to their wool), that England may hereafter prohibit, limit, or discourage our linen trade, when it hath been once, with great pains and expense, thoroughly introduced and settled in this land, be not altogether groundless and unjust?

493. Whether it is possible for this country, which hath neither mines of gold nor a free trade, to support for any time the sending out of specie?

494. Whether in fact our payments are not made by bills? And whether our foreign credit doth not depend on our domestic industry, and our bills on that credit?

495. Whether, in order to mend it, we ought not first to know the peculiar wretchedness of our state? And whether there be any knowing of this but by comparison?

496. Whether there are not single market towns in England that turn more money in buying and selling than whole countries (perhaps provinces) with us?

497. Whether the small town of Birmingham alone doth not,

upon an average, circulate every week, one way or other, to the value of fifty thousand pounds? But whether the same crown may not be often paid?

498. Whether any kingdom in Europe be so good a customer at Bourdeaux as Ireland?

499. Whether the police and economy of France be not governed by wise councils? And whether any one from this country, who sees their towns, and manufactures, and commerce, will not wonder what our senators have been doing?

500. What variety and number of excellent manufactures are to be met with throughout the whole kingdom of France?

501. Whether there are not everywhere some or other mills for many uses, forges and furnaces for iron-work, looms for tapestry, glass-houses, and so forth?

502. What quantities of paper, stockings, hats; what manufactures of wool, silk, linen, hemp, leather, wax, earthenware, brass, lead, tin, &c.?

503. Whether the manufactures and commerce of the single town of Lyons do not amount to a greater value than all the manufactures and all the trade of this kingdom taken together?

504. Whether, in the anniversary fair at the small town of Beaucair upon the Rhone, there be not as much money laid out as the current cash of this kingdom amounts to?

505. Whether the very shreds shorn from woollen cloth, which are thrown away in Ireland, do not make a beautiful tapestry in France?

506. Whether there be not French towns subsisted merely by making pins?

507. Whether the coarse fingers of those very women, those same peasants who one part of the year till the ground and dress the vineyards, are not another employed in making the finest French point?

508. Whether there is not a great number of idle fingers among the wives and daughters of our peasants?

509. Whether the French do not raise a trade from saffron, dying drugs, and the like products, which may do with us as well as with them?

510. Whether we may not have materials of our own growth to supply all manufactures, as well as France, except silk, and

whether the bulk of what silk even France manufactures be not imported?

511. Whether it be possible for this country to grow rich, so long as what is made by domestic industry is spent in foreign luxury?

512. Whether our natural Irish are not partly Spaniards and partly Tartars; and whether they do not bear signatures of their descent from both these nations, which is also confirmed by all their histories?

513. Whether the Tartar progeny is not numerous in this land? And whether there is an idler occupation under the sun than to attend flocks and herds of cattle?

514. Whether the wisdom of the state should not wrestle with this hereditary disposition of our Tartars, and with a high hand introduce agriculture?

515. Whether once upon a time France did not, by her linen alone, draw yearly from Spain about eight millions of livres?

516. Whether the French have not suffered in their linen trade with Spain, by not making their cloth of due breadth; and whether any other people have suffered, and are still likely to suffer, through the same prevarication[6]?

517. Whether the Spaniards are not rich and lazy, and whether they have not a particular inclination and favour for the inhabitants of this island? But whether a punctual people do not love punctual dealers?

518. Whether about fourteen years ago we had not come into a considerable share of the linen trade with Spain, and what put a stop to this?

519. Whether, if the linen manufacture were carried on in the other provinces as well as in the north, the merchants of Cork, Limerick, and Galway would not soon find the way to Spain?

520. Whether the woollen manufacture of England is not divided into several parts or branches, appropriated to particular places, where they are only or principally manufactured; fine cloths in Somersetshire, coarse in Yorkshire, long ells at Exeter, saies at Sudbury, crapes at Norwich, linseys at Kendal, blankets at Witney, and so forth?

[6] [Things, we hear, are in a way of being mended with us in this respect.]—Author.

521. Whether the united skill, industry, and emulation of many together on the same work be not the way to advance it? And whether it had been otherwise possible for England to have carried on her woollen manufacture to so great perfection?

522. Whether it would not on many accounts be right if we observed the same course with respect to our linen manufacture; and that diapers were made in one town or district, damasks in another, sheeting in a third, fine wearing linen in a fourth, coarse in a fifth, in another cambrics, in another thread and stockings, in others stamped linen, or striped linen, or tickings, or dyed linens, of which last kinds there is so great a consumption among the seafaring men of all nations?

523. Whether it may not be worth while to inform ourselves of the different sorts of linen which are in request among different people?

524. Whether we do not yearly consume of French wines about a thousand tuns more than either Sweden or Denmark, and yet whether those nations pay ready money as we do?

525. Whether it be not a custom for some thousands of Frenchmen to go about the beginning of March into Spain, and having tilled the lands and gathered the harvest of Spain, to return home with money in their pockets about the end of November?

526. Whether of late years our Irish labourers do not carry on the same business in England, to the great discontent of many there? But whether we have not much more reason than the people of England to be displeased at this commerce?

527. Whether, notwithstanding the cash, supposed to be brought into it, any nation is, in truth, a gainer by such traffic?

528. Whether the industry of our people employed in foreign lands, while our own are left uncultivated, be not a great loss to the country?

529. Whether it would not be much better for us, if, instead of sending our men abroad, we could draw men from the neighbouring countries to cultivate our own?

530. Whether, nevertheless, we are not apt to think the money imported by our labourers to be so much clear gains to this country; but whether a little reflection and a little political arithmetic may not shew us our mistake?

531. Whether our prejudices about gold and silver are not very

apt to infect or misguide our judgments and reasonings about the public weal?

532. Whether it be not a good rule whereby to judge of the trade of any city, and its usefulness, to observe whether there is a circulation through the extremities, and whether the people round about are busy and warm?

533. Whether we had not, some years since, a manufacture of hats at Athlone, and of earthenware at Arklow, and what became of those manufactures?

534. Why we do not make tiles of our own, for flooring and roofing, rather than bring them from Holland?

535. What manufactures are there in France and Venice of gilt-leather, how cheap and how splendid a furniture?

536. Whether we may not, for the same use, manufacture divers things at home of more beauty and variety than wainscot, which is imported at such expense from Norway?

537. Whether the use and the fashion will not soon make a manufacture?

538. Whether, if our gentry used to drink mead and cider, we should not soon have those liquors in the utmost perfection and plenty?

539. Whether it be not wonderful that with such pastures, and so many black cattle, we do not find ourselves in cheese?

540. Whether great profits may not be made by fisheries; but whether those of our Irish who live by that business do not contrive to be drunk and unemployed one half of the year?

541. Whether it be not folly to think an inward commerce cannot enrich a state, because it doth not increase its quantity of gold and silver? And whether it is possible a country should not thrive, while wants are supplied, and business goes on?

542. Whether plenty of all the necessaries and comforts of life be not real wealth?

543. Whether Lyons, by the advantage of her midland situation and the rivers Rhone and Saone, be not a great magazine or mart for inward commerce? And whether she doth not maintain a constant trade with most parts of France; with Provence for oils and dried fruits, for wines and cloth with Languedoc, for stuffs with Champaign, for linen with Picardy, Normandy, and Bretagne, for corn with Burgundy?

544. Whether she doth not receive and utter all those commodities, and raise a profit from the distribution thereof, as well as of her own manufactures, throughout the kingdom of France?

545. Whether the charge of making good roads and navigable rivers across the country would not be really repaid by an inward commerce?

546. Whether, as our trade and manufactures increased, magazines should not be established in proper places, fitted by their situation, near great roads and navigable rivers, lakes, or canals, for the ready reception and distribution of all sorts of commodities from and to the several parts of the kingdom; and whether the town of Athlone, for instance, may not be fitly situated for such a magazine, or centre of domestic commerce?

547. Whether an inward trade would not cause industry to flourish, and multiply the circulation of our coin, and whether this may not do as well as multiplying the coin itself?

548. Whether the benefits of a domestic commerce are sufficiently understood and attended to; and whether the cause thereof be not the prejudiced and narrow way of thinking about gold and silver?

549. Whether there be any other more easy and unenvied method of increasing the wealth of a people?

550. Whether we of this island are not from our peculiar circumstances determined to this very commerce above any other, from the number of necessaries and good things that we possess within ourselves, from the extent and variety of our soil, from the navigable rivers and good roads which we have or may have, at a less expense than any people in Europe, from our great plenty of materials for manufactures, and particularly from the restraints we lie under with regard to our foreign trade?

551. Whether annual inventories should not be published of the fairs throughout the kingdom, in order to judge of the growth of its commerce?

552. Whether there be not every year more cash circulated at the card-tables of Dublin than at all the fairs of Ireland?

553. Whether the wealth of a country will not bear proportion to the skill and industry of its inhabitants?

554. Whether foreign imports that tend to promote industry

should not be encouraged, and such as have a tendency to promote luxury should not be discouraged?

555. Whether the annual balance of trade between Italy and Lyons be not about four millions in favour of the former, and yet, whether Lyons be not a gainer by this trade?

556. Whether the general rule, of determining the profit of a commerce by its balance, doth not, like other general rules, admit of exceptions?

557. Whether it would not be a monstrous folly to import nothing but gold and silver, supposing we might do it, from every foreign part to which we trade? And yet, whether some men may not think this foolish circumstance a very happy one?

558. But whether we do not all see the ridicule of the Mogul's subjects, who take from us nothing but our silver, and bury it under ground, in order to make sure thereof against the resurrection?

559. Whether he must not be a wrongheaded patriot or politician, whose ultimate view was drawing money into a country, and keeping it there?

560. Whether it be not evident that not gold but industry causeth a country to flourish?

561. Whether it would not be a silly project in any nation to hope to grow rich by prohibiting the exportation of gold and silver?

562. Whether there can be a greater mistake in politics than to measure the wealth of the nation by its gold and silver?

563. Whether gold and silver be not a drug, where they do not promote industry? Whether they be not even the bane and undoing of an idle people?

564. Whether gold will not cause either industry or vice to flourish? And whether a country, where it flowed in without labour, must not be wretched and dissolute like an island inhabited by Buccaneers?

565. Whether arts and virtue are not likely to thrive, where money is made a means to industry? But whether money without this would be a blessing to any people?

566. Whether keeping cash at home, or sending it abroad, just as it most serves to promote industry, be not the real interest of every nation?

567. Whether commodities of all kinds do not naturally flow where there is the greatest demand? Whether the greatest demand for a thing be not where it is of most use? Whether money, like other things, hath not its proper use? Whether this use be not to circulate? Whether therefore there must not of course be money where there is a circulation of industry?

568. Whether it is not a great point to know what we would be at? And whether whole states, as well as private persons, do not often fluctuate for want of this knowledge?

569. Whether gold may not be compared to Sejanus's horse, if we consider its passage through the world, and the fate of those nations which have been successively possessed thereof?

570. Whether means are not so far useful as they answer the end? And whether, in different circumstances, the same ends are not obtained by different means?

571. If we are a poor nation, abounding with very poor people, will it not follow that a far greater proportion of our stock should be in the smallest and lowest species than would suit with England?

572. Whether, therefore, it would not be highly expedient, if our money were coined of peculiar values, best suited to the circumstances and uses of our own country; and whether any other people could take umbrage at our consulting our own convenience, in an affair entirely domestic, and that lies within ourselves?

573. Whether every man doth not know, and hath not long known, that the want of a mint causeth many other wants in this kingdom?

574. What harm did England sustain about three centuries ago, when silver was coined in this kingdom?

575. What harm was it to Spain that her provinces of Naples and Sicily had all along mints of their own?

576. Whether it may not be presumed that our not having a privilege, which every other kingdom in the world enjoys, be not owing to our own want of diligence and unanimity in soliciting for it?

577. Whether it be not the interest of England that we should cultivate a domestic commerce among ourselves? And whether it could give them any possible jealousy, if our small sum of cash

was contrived to go a little farther, if there was a little more life in our markets, a little more buying and selling in our shops, a little better provision for the backs and bellies of so many forlorn wretches throughout the towns and villages of this island?

578. Whether Great Britain ought not to promote the prosperity of her Colonies, by all methods consistent with her own? And whether the Colonies themselves ought to wish or aim at it by others?

579. Whether the remotest parts from the metropolis, and the lowest of the people, are not to be regarded as the extremities and capillaries of the political body?

580. Whether, although the capillary vessels are small, yet obstructions in them do not produce great chronical diseases?

581. Whether faculties are not enlarged and improved by exercise?

582. Whether the sum of the faculties put into act, or, in other words, the united action of a whole people, doth not constitute the *momentum* of a state?

583. Whether such *momentum* be not the real stock or wealth of a state; and whether its credit be not proportional thereunto?

584. Whether in every wise state the faculties of the mind are not most considered?

585. Whether the *momentum* of a state doth not imply the whole exertion of its faculties, intellectual and corporeal; and whether the latter without the former could act in concert?

586. Whether the divided force of men, acting singly, would not be a rope of sand?

587. Whether the particular motions of the members of a state, in opposite directions, will not destroy each other, and lessen the *momentum* of the whole; but whether they must not conspire to produce a great effect?

588. Whether the ready means to put spirit into this state, to fortify and increase its *momentum*, would not be a national bank, and plenty of small cash?

589. Whether that which employs and exerts the force of a community deserves not to be well considered and well understood?

590. Whether the immediate mover, the blood and spirits, be not money, paper, or metal; and whether the soul or will of the

community, which is the prime mover that governs and directs the whole, be not the legislature?

591. Supposing the inhabitants of a country quite sunk in sloth, or even fast asleep, whether, upon the gradual awakening and exertion, first of the sensitive and locomotive faculties, next of reason and reflection, then of justice and piety, the *momentum* of such country or state would not, in proportion thereunto, become still more and more considerable?

592. Whether that which in the growth is last attained, and is the finishing perfection of a people, be not the first thing lost in their declension?

593. Whether force be not of great consequence, as it is exerted; and whether great force without wisdom may not be a nuisance?

594. Whether the force of a child, applied with art, may not produce greater effects than that of a giant? And whether a small stock in the hands of a wise state may not go farther, and produce more considerable effects, than immense sums in the hands of a foolish one?

595. Whose fault is it if poor Ireland still continues poor?

A DISCOURSE

ADDRESSED TO

MAGISTRATES AND MEN IN AUTHORITY.

OCCASIONED

BY THE ENORMOUS LICENSE AND IRRELIGION

OF THE TIMES.

'Gallio cared for none of these things.'—Acts xviii. 17.

1736.

A DISCOURSE

ADDRESSED TO MAGISTRATES AND MEN IN AUTHORITY[1].

THE pretensions and discourse of men throughout these kingdoms would, at first view, lead one to think the inhabitants were all politicians; and yet, perhaps, political wisdom hath in no age or country been more talked of, and less understood. License is taken for the end of government, and popular humour for its origin. No reverence for the law, no attachment to the constitution, little attention to matters of consequence, and great altercation upon trifles, such idle projects about religion and government, as if the public had both to choose, a general contempt for all authority, divine and human, an indifference about

[1] This *Discourse* was first printed at Dublin (by Faulkner) in 1736. It was republished there in 1738, and in 1752 it appeared in the *Miscellany*. It is said to have been occasioned more immediately by an impious Dublin society of so-called *Blasters*, which it put a stop to. (Stock's *Life of Berkeley*.)

The *Discourse* is a defence of a National Religion. It proceeds upon the theory of civil authority contained in the *Discourse of Passive Obedience*, with which, as well as with the Third and Fourth Dialogues in *Alciphron*, it may be compared, in a study of the ethical and political principles of Berkeley. One chief duty of the Magistrate is, he argues, the regulation of the opinions of society; seeing that the actions of men are determined by their opinions, and especially by what they think and believe about God and the future. It is true that such beliefs must in the case of the majority be unreasoned—in a word, they must be *prejudices*, and as such received upon trust; but they are not on that account less useful, or less true. Indeed, in moral questions, utility and truth, according to Berkeley, are not to be divided, the general good of mankind being the rule and measure of moral truth. It is therefore a fundamental principle of society that the religious prejudices of men should be reverenced. Thought no doubt is and must be free, but 'blasphemy against God is a great crime against the state' (p. 427); and 'an inward sense of the supreme majesty of the King of kings is the only thing that can beget and preserve a true respect for subordinate majesty in all the degrees of power—the first link of authority being fixed at the throne of God' (p. 417). Berkeley, in short, had not abandoned the belief that a system of religious 'prejudices,' whose truth has been tested by their usefulness, ought to be steadily sustained by the supreme power in society.

The *Harleian Miscellany* (vol. iii. pp. 177–185) contains *A Letter to the Right Rev. the Lord Bishop of Cloyne, by a Gentleman in the Army, occasioned by a Dissertation by the Bishop on the text 'Gallio cared for none of these things.'* This *Letter*, professedly seconding the Bishop's appeal, appears to have been written about 1739. 'It contains,' says the Editor, 'so many touches of elegance and judgment that we could not refuse it a place in this Collection, in which, though it was our original design to recover such pieces as begin to disappear by their antiquity, we shall not neglect sometimes to preserve those writings from destruction which, by accident, or envy, have been hitherto kept secret.'

the prevailing opinions, whether they tend to produce order or disorder, to promote the empire of God or the devil—these are the symptoms that strongly mark the present age; and this could never have been the case, if a neglect of religion had not made way for it.

When the Jews accused Paul upon religious matters and points of their law before Gallio, the Roman magistrate, it is said that Gallio 'cared for none of these things.' And, it is to be feared, there are not a few magistrates in this Christian country who think with the same indifference on the subject of religion. Herein, nevertheless, they judge amiss, and are much wanting to their duty. For, although it be admitted that the magistrate's peculiar object is the temporal welfare of the state; yet, this will by no means exclude a proper care about the prevailing notions and opinions of religion, which influence the lives and actions of men, and have therefore a mighty effect on the public. Men's behaviour is the consequence of their principles. Hence it follows that, in order to make a state thrive and flourish, care must be taken that good principles be propagated in the minds of those who compose it.

It would be vain to depend on the outward form, the constitution, and structure, of a state; while the majority are ever governed by their inward ways of thinking, which at times will break out and shew themselves paramount to all laws and institutions whatsoever. It must be great folly therefore to overlook notions, as matters of small moment to the state; while experience shews there is nothing more important; and that a prevailing disorder in the principles and opinions of its members is ever dangerous to society, and capable of producing the greatest public evils.

Man is an animal formidable both from his passions and his reason; his passions often urging him to great evils, and his reason furnishing means to achieve them. To tame this animal, and make him amenable to order, to inure him to a sense of justice and virtue, to withhold him from ill courses by fear, and encourage him in his duty by hopes; in short, to fashion and model him for society, hath been the aim of civil and religious institutions; and in all times, the endeavour of good and wise men. The aptest method for attaining this end hath been always judged a proper education.

If men's actions are an effect of their principles, that is, of their notions, their belief, their persuasions; it must be admitted that principles early sown in the mind are the seeds which produce fruit and harvest in the ripe state of manhood. How lightly soever some men may speak of notions, yet, so long as the soul governs the body, men's notions must influence their actions, more or less, as they are stronger or weaker; and to good or evil, as they are better or worse.

Our notions and opinions are a constant check on our appetites, and balance to our passions: and although they may not in every instance control and rule, yet they will never fail strongly to affect both the one and the other. What is it that bridles the impetuous desires of men? that restrains them when they are driven by the most violent passions? In a word, what is it that renders this world habitable, but the prevailing notions of order, virtue, duty, and Providence? Some, perhaps, may imagine that the eye of the magistrate alone is sufficient to keep mankind in awe. But, if every man's heart was set to do all the mischief his appetite should prompt him to do, as often as opportunity and secrecy presented themselves, there could be no living in the world.

And although too many of those intrusted with civil power, in these our days, may be said with Gallio to 'care for none of those things;' and many more, who would pass for men of judgment and knowledge, may look on notions early imbibed, before their grounds and reasons are apprehended or understood, to be but mere prejudices, yet this will detract nothing from their truth and usefulness. To place this matter in a due light, I propose to shew that a system of salutary notions is absolutely necessary to the support of every civil constitution. I shall enforce this point by the testimony of those who are esteemed the wisest men; and I shall make some remarks on the modern prevailing spirit, and the tendency of the maxims of our times.

Order is necessary, not only to the well-being, but to the very being of a state. Now, order and regularity in the actions of men are not an effect of appetite or passion, but of judgment: and the judgment is governed by notions or opinions. There must, therefore, of necessity, in every state, be a certain system of salutary notions, a prevailing set of opinions, acquired either by private reason and reflection, or taught and instilled by the

general reason of the public; that is, by the law of the land. True it is that where men either cannot or will not use their own reason, think, and examine for themselves; in such case the notions taught or instilled into their minds are embraced rather by the memory than the judgment. Nor will it be any objection to say that these are prejudices; inasmuch as they are therefore neither less useful nor less true, although their proofs may not be understood by all men.

Licentious habits of youth give a cast or turn to age: the young rake makes an old infidel; libertine practices beget libertine opinions; and a vicious life generally ends in an old age of prejudice not to be conquered by reasoning. Of this we see instances even in persons celebrated for parts, and who reason admirably on other points where they are not biassed; but on the subject of religion obtrude their guesses, surmises, and broken hints for arguments. Against such there is no reasoning.

Prejudices are notions or opinions which the mind entertains without knowing the grounds and reasons of them, and which are assented to without examination. The first notions which take possession of the minds of men, with regard to duties social, moral, and civil, may therefore be justly styled prejudices. The mind of a young creature cannot remain empty; if you do not put into it that which is good, it will be sure to receive that which is bad.

Do what you can, there will still be a bias from education; and, if so, is it not better this bias should lie towards things laudable and useful to society? This bias still operates, although it may not always prevail. The notions first instilled have the earliest influence, take the deepest root, and generally are found to give a colour and complexion to the subsequent lives of men, inasmuch as they are in truth the great source of human actions. It is not gold, or honour, or power that move men to act, but the opinions they entertain of those things. Hence it follows that if a magistrate should say, 'No matter what notions men embrace, I will take heed to their actions;'—therein he shews his weakness; for, such as are men's notions, such will be their deeds.

For a man to do as he would be done by; to love his neighbour as himself; to honour his superiors; to believe that God scans all his actions, and will reward or punish them; and to think

that he who is guilty of falsehood or injustice hurts himself more than any one else: are not these such notions and principles as a very wise governor or legislator would covet above all things to have firmly rooted in the mind of every individual under his care? This is allowed, even by the enemies of religion, who would fain have it thought the offspring of state policy, honouring its usefulness at the same time that they disparage its truth. What, therefore, cannot be acquired by every man's reasoning must be introduced by precept, and rivetted by custom; that is to say, the bulk of mankind must, in all civilized societies, have their minds, by timely instruction, well seasoned and furnished with proper notions, which, although the grounds or proofs thereof be unknown to them, will nevertheless influence their conduct, and so far render them useful members of the state. But, if you strip men of these their notions, or, if you will, prejudices, with regard to modesty, decency, justice, charity, and the like, you will soon find them so many monsters, utterly unfit for human society.

I desire it may be considered that most men want leisure, opportunity, or faculties to derive conclusions from their principles, and establish morality on a foundation of human science. True it is (as St. Paul observes) that 'the invisible things of God, from the creation of the world are clearly seen' (Romans i. 20). And from thence the duties of natural religion may be discovered. But these things are seen and discovered by those alone who open their eyes and look narrowly for them. Now, if you look throughout the world, you shall find but few of these narrow inspectors and inquirers, very few who make it their business to analyze opinions and pursue them to their rational source, to examine whence truths spring, and how they are inferred. In short, you shall find all men full of opinions, but knowledge only in a few.

It is impossible, from the nature and circumstances of human kind, that the multitude should be philosophers, or that they should know things in their causes. We see every day that the rules or conclusions alone are sufficient for the shopkeeper to state his account, the sailor to navigate his ship, or the carpenter to measure his timber; none of which understand the theory; that is to say, the grounds and reasons either of arithmetic or geometry. Even so in moral, political, and religious matters, it is manifest that the rules and opinions early imbibed at the

first dawn of understanding, and without the least glimpse of science, may yet produce excellent effects, and be very useful to the world; and that in fact they are so will be very visible to every one who shall observe what passeth round about him.

It may not be amiss to inculcate that the difference between prejudices and other opinions doth not consist in this—that the former are false, and the latter true; but in this—that the former are taken upon trust, and the latter acquired by reasoning. He who hath been taught to believe the immortality of the soul may be as right in his notion as he who hath reasoned himself into that opinion. It will then by no means follow that because this or that notion is a prejudice, it must be therefore false. The not distinguishing between prejudices and errors is a prevailing oversight among our modern Free-thinkers.

There may be, indeed, certain mere prejudices or opinions, which, having no reasons either assigned or assignable to support them, are nevertheless entertained by the mind, because they intruded betimes into it. Such may be supposed false, not because they were early learned, or learned without their reasons; but because there are in truth no reasons to be given for them.

Certainly, if a notion may be concluded false because it was early imbibed, or because it is with most men an object of belief rather than of knowledge, one may by the same reasoning conclude several propositions of Euclid to be false. A simple apprehension of conclusions as taken in themselves, without the deductions of science, is what falls to the share of mankind in general. Religious awe, the precepts of parents and masters, the wisdom of legislators, and the accumulated experience of ages supply the place of proofs and reasonings with the vulgar of all ranks: I would say that discipline, national constitution, and laws human and divine are so many plain land-marks, which guide them into the paths wherein it is presumed they ought to tread.

From what hath been premised, it plainly appears, that in the bulk of mankind there are and must be prejudices, that is, opinions taken upon trust; or, in other words, that there are points of faith among all men whatsoever, as well as among Christians.

And, as it is evident that the unthinking part of every age, sex, and condition among us, must necessarily receive notions with the submission of faith; so it is very reasonable that they should

submit their faith to the greatest authorities human and Divine, the law and the gospel. But if once all reverence for these be destroyed, our pretenders to moral knowledge will have no authority to imbue the multitude with such notions as may control their appetites. From all which it follows that the modern schemes of our Free-thinkers, who pretend to separate morality from religion, how rational soever they may seem to their admirers, are, in truth and effect, most irrational and pernicious to civil society.

Let any one who thinks at all consider the savage state of undisciplined men, whose minds are nurtured to no doctrine, broke by no instruction, governed by no principle. Let him at the same time reflect on a society of persons educated in the principles of our Church, formed betimes to fear God, to reverence their superiors, to be grateful to their benefactors, forgiving to their enemies, just and charitable to all men; and he will then be able to judge of the merits of those who are so active to weed out the prejudices of education.

Among the many wild notions broached in these giddy times, it must be owned that some of our declaimers against prejudice have wrought themselves into a sort of esteem for savages, as a virtuous and unprejudiced people. In proof of which, they allege their being free from many vices practised in civilized nations. Now, it is very true, among savages there are few instances to be found of luxury, avarice, or ambition; not that the contrary virtues take place, but because the opportunities and faculties for such vices are wanting. For the same reason, you do not see them in brutes.

What they esteem and admire in those creatures is not innocence, but ignorance: it is not virtue, but necessity. Give them but the means of transgressing, and they know no bounds. For example: supply the water-drinking savage with strong liquor, and he shall be drunk for several days and nights together. Again: we admit an uneducated savage knows not how to supplant a rival with the refined treachery of a courtier; yet, if you put his foe once in his power, you shall soon see what a horrible relish and delight the monster hath in cruelty.

Above all others, religious notions, or, if you will, prejudices (since this, as hath been already observed, detracts nothing from their truth and usefulness) have the most influence, they are the strongest curb from vice, and the most effectual spur to worthy conduct. And, indeed, whether we consider the reason of things,

or the practice of men in all times, we shall be satisfied that nothing truly great and good can enter into the heart of one attached to no principles of religion, who believes no Providence, who neither fears hell, nor hopes for heaven.

Punishments and rewards have always had, and always will have, the greatest weight with men; and the most considerable of both kinds are proposed by religion, the duties whereof fall in with the views of the civil magistrate: it undeniably follows, that nothing can add more strength to a good and righteous government than religion. Therefore it mainly concerns governors to keep an attentive eye on the religion of their subjects. And indeed it is one lesson to magistrate and people, prince and subject, 'Keep my commandments and live; and my law as the apple of thine eye' (Prov. vii. 2).

Although it is no consequence, from what hath been said, that men should be debarred the free use of reason and inquiry, yet surely it will follow that, without good reason, a man should not reject those notions which have been instilled by the laws and education of his country. And even they who think they have such reason have nevertheless no right of dictating to others[2]. It is true, Divine authority is superior to all human prejudices, institutions, and regards whatsoever. And it is wise, although at the risk of liberty or life, to obey God rather than man. But our modern reformers of prejudices have nothing to plead of that kind[3].

There is no magistrate so ignorant as not to know that power —physical power—resides in the people: but authority is from opinion, which authority is necessary to restrain and direct the people's power, and therefore religion is the great stay and support of a state. Every religion that inculcates virtue and discourageth vice is so far of public benefit. The Christian religion doth not only this, but further makes every legal constitution sacred by commanding our submission thereto. 'Let every soul be subject to the higher powers (saith St. Paul), for the powers that be are ordained of God' (Rom. xiii. 1). And, in effect, for several years past, while the reverence for our church and religion hath been

[2] [Though a man's private judgment be a rule to himself, it will not thence follow that he hath any right to set it up for a rule to others.]—AUTHOR.

[3] [No man can say he is obliged in conscience, honour, or prudence, to insult the public wisdom, or to ridicule the laws under whose protection he lives.]—AUTHOR.

decaying and wearing off from the minds of men, it may be observed that loyalty hath in proportion lost ground; and now the very word seems quite forgotten. Submission for conscience, as well as for wrath, was once reckoned a useful lesson; but now, with other good lessons, is laid aside as an obsolete prejudice.

The prince or magistrate, however great or powerful, who thinks his own authority sufficient to make him respected and obeyed, lies under a woful mistake, and never fails to feel it sooner or later. Obedience to all civil power is rooted in the religious fear of God: it is propagated, preserved, and nourished by religion. This makes men obey, not with eye-service, but in sincerity of heart. Human regards may restrain men from open and penal offences; but the fear of God is a restraint from all degrees of all crimes, however circumstanced. Take away this stay and prop of duty, this root of civil authority; and all that was sustained by it, or grew from it, shall soon languish. The authority, the very being of the magistrate, will prove a poor and precarious thing.

An inward sense of the supreme majesty of the King of kings is the only thing that can beget and preserve a true respect for subordinate majesty in all the degrees of power—the first link of authority being fixed at the throne of God. But, in these our days, that *majestas imperii*, that sacredness of character, which rooted in a religious principle was the great guard and security of the state, is through want thereof become the public scorn. And indeed what hold can the prince or magistrate have on the conscience of those who have no conscience? How can he build on the principles of such as have no principles? Or how can he hope for respect where God himself is neglected?

It is manifest that no prince upon earth can hope to govern well, or even to live easy and secure, much less respected by his people, if he do not contribute by his example and authority to keep up in their minds an awful sense of religion. As for a moral sense, and moral fitness, or eternal relations, how insufficient those things are for establishing general and just notions of morality, or for keeping men within due bounds, is so evident from fact and experience that I need not now enter into a particular disquisition about them[4].

It must be owned that the claws of rapine and violence may in

[4] [See *Alciphron*, Dial. III. and IV.]—Author.

some degree be pared and blunted by the outward polity of a state. But should we not rather try, if possible, to pull them quite out? The evil effects of wickedness may be often redressed by public justice. But would it not be better to heal the source, and, by an inward principle, extirpate wickedness from the heart, rather than depend altogether on human laws for preventing or redressing the bad effects thereof? 'I might (said the Chinese Doctor Confucius) hear and decide controversies as well as another: but what I would have is, that men should be brought to abstain from controversies out of an inward love and regard for each other[5].'

Too many in this age of free remarks and projects are delighted with republican schemes; and imagine they might remedy whatever was amiss, and render a people great and happy, merely by a new plan or form of government. This dangerous way of thinking and talking is grown familiar, through the foolish freedom of the times[6]. But, alas! those men do not seem to have touched either the true cause or cure of public evils. Be the plan ever so excellent, or the architects ever so able, yet no man in his wits would undertake to build a palace with mere mud or dirt. There must be fit materials; and without a religious principle men can never be fit materials for any society, much less for a republic. Religion is the centre which unites, and the cement which connects the several parts or members of the political body. Such it hath been held by all wise men, from the remotest times down to our ingenious contemporaries; who, if they are in the right, it must be admitted that all the rest of the world have been in the wrong.

From the knowledge of its being absolutely necessary to the government of a state that the hearts and minds of the people be inwardly imbued with good principles, Plato[7] tells that 'Jupiter, to preserve the race of men from perishing, sent Mercury, with orders to introduce modesty and justice among them, as the firmest ties of human society; and without which it could not subsist.' And elsewhere the same author[8] gives it plainly as his sense that 'concerning those great duties which men's appetites and passions

[5] [*Scientia Sin.* lib. I. fol. 12.]—Author. The reference is to the *Confucius Sinarum philosophus, sive Scientia Sinensis*, published at Paris in 1687.

[6] [Men forget that liberty consists in a mean, or that there is any other extreme beside tyranny.]—Author.

[7] [*In Protagora.*]—Author.

[8] [*De Legibus*, lib. VIII.]—Author.

render difficult, it should seem rather the work of God to provide, than of human legislators, if it were possible to hope for a system of laws framed and promulgated by God himself.' You see how agreeable the Mosaic and Christian institutions are to the wishes of the wisest heathen.

Moses, indeed, doth not insist on a future state, the common basis of all political institutions; nor do other lawgivers make a particular mention of all things necessary, but suppose some things as generally known or believed. The belief of a future state (which it is manifest the Jews were possessed of long before the coming of Christ) seems to have obtained among the Hebrews from primeval tradition; which might render it unnecessary for Moses to insist on that article. But the Sadducees and Epicureans had, in progress of time, gone so far towards rooting out this ancient and original sentiment that it was in danger of being lost, had it not been taught and promulgated in a new light by our blessed Saviour.

But many among us who would pass for assertors of truth and liberty are accustomed to rail at this, and all other established opinions, as prejudices which people are taught whether they will or no, and before they are able to distinguish whether they are right or wrong. These lovers of truth would do well to consider that, in political, moral, and religious matters, the opinions of the vulgar, whether they go in coaches, or walk on foot, are for the most part prejudices; and are so like to be whatever side of the question they embrace; whether they follow the old maxims of the religion of their country, or the modern instructions of their new masters. I have already observed that a point's being useful, and inculcated betimes, can be no argument of its falsehood, even although it should be a prejudice; far otherwise, utility and truth are not to be divided; the general good of mankind being the rule or measure of moral truth[9].

I shall now add, that it is to be apprehended many of those who are the most forward to banish prejudices would be the first to feel the want of them. It is even pitiful to think what would become of certain modern declaimers on that article were prejudice really set aside, and were all men to be weighed in the exact scale of merit, and considered in proportion only to their intrinsic worth.

[9] [See *Alciphron*, Dial. I. sect. 16.]—Author.

Some prejudices are grounded in truth, reason, and nature. Such are the respects which are paid to knowledge, learning, age, honesty, and courage, in all civilized countries. Others are purely the effect of particular constitutions; such are the respects, rights, and preeminences ascribed to some men by their fellow-subjects, on account of their birth and quality; which, in the great empires of Turkey and China, pass for nothing; and will pass for nothing elsewhere, as soon as men have got rid of their prejudices, and learned to despise the constitutions of their country. It may behove those who are concerned to reflect on this betimes.

God, comprehending within himself the beginning, end, and middle of all things and times, exerts his energy throughout the whole creation. He never ceaseth to influence by instinct, by the light of nature, by his declared will. And it is the duty of magistrates and lawgivers to cultivate and encourage those Divine impressions in the minds of all men under their care. We are not to think it is the work of God, and therefore not to be seconded by human care. Far otherwise, for that very reason it claims our utmost care and diligence; it being the indispensable duty of all good men, throughout the whole course of their lives, to co-operate with the designs of Providence. In religion, as in nature, God doth somewhat, and somewhat is to be done on the part of man. He causeth the earth to bring forth materials for food and raiment; but human industry must improve, prepare, and properly apply both the one and the other, or mankind may perish with cold and hunger. And, according to this same analogy[10], the principles of piety and religion, the things that belong to our salvation, although originally and primarily the work of God, yet require the protection of human government, as well as the furtherance and aid of all wise and good men.

And if religion in all governments be necessary, yet it seems to be so more especially in monarchies: forasmuch as the frugal manners and more equal fortunes in republics do not so much inflame men's appetites, or afford such power or temptation to mischief, as the high estate and great wealth of nobles under a

[10] [It will be sufficient if such analogy appears between the dispensations of grace and nature, as may make it probable to suppose them derived from the same Author. —*Alciphron*, Dial. VI. sect. 31.]—AUTHOR. Butler's *Analogy*, in which a similar doctrine is unfolded, was first published in 1736 —the same year as Berkeley's *Discourse*.

king. Therefore, although the magistrate (as was already observed) hath for his peculiar object the temporal well being of the state, yet this will by no means exempt him from a due concern for the religion of his country.

What was the sense of our ancestors on this point appears throughout the whole constitution of these kingdoms; and, in order to justify this constitution, and the wisdom of those who framed it, I shall crave leave to make use of some unsuspected testimonies, ancient and modern, which will shew that the public care of a National Religion hath been always a most principal point in the esteem of wise men, however run down by the prevailing licence of our times.

The first testimony I shall produce is that of Zeleucus, the famous lawgiver of the Locrians, who, in his preamble to his laws[11], begins with religion, laying it down as the corner-stone or foundation of his whole superstructure, 'that every inhabitant, subject of the state, should be persuaded that there is a God and Divine Providence: that the only way of becoming dear to God is by endeavouring above all things to be good, both in deed and in will: that a worthy citizen is one that prefers integrity to wealth.' He farther admonishes those who are difficult to persuade, 'to bethink themselves of God's providence, and the punishments that await evil-doers; and in all their actions to be ever mindful of the last day as if it were present, or in case the devil[12] should tempt a man to sin, he exhorts such a one to frequent the temples and altars, worshipping and imploring the Divine assistance.'

Aristotle[13], discoursing of the means to preserve a monarchy, admonishes the supreme magistrate, above all things, to shew himself zealous in religious matters; and this particularly for two reasons. '1. Because the subjects will have less to fear from one who fears God. 2. Because they will be less apt to rebel against him whom they take to be the favourite of Heaven.' And elsewhere this same philosopher recommends the worship of the gods, as the first care of the state[14].

Plato likewise begins his Laws with the care of religious rites.

[11] [Stobæus *De Leg. et Consuet.* Ser. 145.] —Author. The reference is to the *Sermones* (*Ἀνθολόγιον*) of Stobæus, the learned Greek compiler.

[12] [*Δαίμων κακός.*]—Author.

[13] [*De Republ.* lib. V.]—Author.

[14] [Ibid. lib. VII. cap. 17.]—Author.

He even maintains religion or Divine worship, to be the chief aim and scope of human life[15].

Hippodamus the Milesian[16], in his scheme of a republic, allotted a third part of the land for maintaining Divine worship[17].

The Roman historians and poets do so abound with passages ascribing the successes of their government to religion, and its declension to the want or neglect thereof, that it may seem impertinent to enter into a detail of what every school-boy knows.

To come from ancient to modern authority, Machiavel himself represents religion as absolutely necessary to maintain civil order and government. He observes, that for many years there was a most awful sense of religion in the old Romans; and that this did much facilitate their great undertakings. He likewise observes, and shews by divers instances, that the Romans were more afraid to break an oath than to transgress the laws; and that those things which even the love of their country and constitution could not bring them to, they were brought to through a sense of religion. Upon the whole he concludes, that old Rome was more obliged to Numa, who established a national religion, than to Romulus himself, the founder of that state[18].

And here by the by I shall take notice, that some may imagine the various forms and institutions of religion ought to unsettle men's minds with regard to the truth and certainty of any. But this matter rightly considered, will, I think, produce a contrary effect. It sheweth, indeed, that men groping out their way by the dim twilight of nature did only approach, some nearer, some farther off, while all were short of the truth. But then it sheweth likewise, upon the whole and in general, that religion is so natural to our minds, so useful to society, and of so necessary importance to the world, as might well prove its truth, and render it worthy of the Divine care to propagate by prophecies, miracles, and the mission of the Son of God.

Philip de Comines[19], a wise statesman and honest writer, who had great experience in affairs, declares it to be his opinion, 'that want of religious faith is the only fountain of all mischiefs.'

[15] [*De Leg.* lib. IV. et lib. VI.]—Author.

[16] [Arist. *De Republ.* lib. II. cap. 8.]—Author.

[17] [The abolishing of the Christian religion upon a frugal principle must be bad policy, if we may judge what will be by what hath been in the great Pagan states of antiquity; whose religions, upon a fair estimate, will be found to have been more expensive.]—Author.

[18] [*Discorsi*, lib. I. cap. 12.]—Author.

[19] [*Hist.* B. V.]—Author.

And that able minister, the famous Monsieur Colbert, makes it his observation, 'that if once the ecclesiastical character, as such, is vilified, the civil magistrate, even the crown itself, will, in consequence thereof, lose all authority [20].'

It would be no hard matter to produce a cloud of testimonies in behalf of a national religion, from the most eminent of our own writers; but I shall content myself with adding one only, and that from a very unsuspected writer, Mr. Harrington, author of the *Oceana*, who shews that to be just and fair which others have shewed to be expedient. 'A man (saith he) that, pleading for liberty of conscience, refuseth liberty to the national conscience, must be most absurd [21].' And again: 'If the conviction of a man's private conscience produce his private religion, the conviction of the national conscience must produce a national religion [22].'

All these authorities are taken from thinking men and able politicians, none of which can be supposed to say what he did not really think; and it had been very easy to have increased the number. But I am sorry I was obliged to mention any at all, in proof of so plain and fundamental a point as that of a national religion. It is, indeed, a shameful necessity we lie under, at proving at this time of the day the first elements, I will not say of Christianity, but even of natural light, from reasons and from authorities. The spirit of the times hath rendered this unavoidable.

If it should be asked after all, How comes it then to pass that the fashionable and prevailing maxims among our betters in a neighbouring nation should run directly counter to all such reasons and authorities? I will answer this question by asking, When were our neighbours known to abound to that degree in highwaymen, murderers, housebreakers, incendiaries? When did such numbers lay violent hands on themselves? When was there such a general and indecent contempt of whatever is esteemed sacred, in the state as well as the church? When were there known among them such public frauds, such open confederacies in villany, as the present age hath produced? When were they lower in the esteem of mankind, more divided at home, or more insulted abroad?

[20] [*Test. Pol.* c. 8.]—Author. [21] [P. 27. first edit.]—Author.
[22] [Ibid.]—Author.

We of this land have a fatal tendency to overlook the good qualities, and imitate whatever is amiss in those whom we respect. This leads me to make some remarks on the modern spirit of reformation, that works so strongly in both these kingdoms.

Freedom of thought is the general plea and cry of the age; and we all grant that thinking is the way to know; and the more real knowledge there is in the land, the more likely it will be to thrive. We are not therefore against freedom of thought, but we are against those unthinking overbearing people [23], who, in these odd times, under that pretence, set up for reformers, and new moulders of the constitution. We declare against those, who would seduce innocent and unexperienced persons from the reverence they owe to the laws and religion of their country; and, under the notion of extirpating prejudices, would erase from their minds all impressions of piety and virtue, in order to introduce prejudices of another kind, destructive of society.

We esteem it a horrible thing to laugh at the apprehensions of a future state, with the author of the *Characteristics* [24]; or, with him who wrote the *Fable of the Bees*, to maintain that 'moral virtues are the political offspring which flattery begot upon pride' [25]; that 'in morals there is no greater certainty than in fashions of dress' [26]; that, indeed, 'the doctrine of good manners teacheth men to speak well of all virtues; but requires no more of them in any age or country, than the outward appearance of those in fashion' [27]. Two authors of infidel systems these, who, setting out upon opposite principles, are calculated to draw all mankind, by flattering either their vanity or their passions, into one or other system. And yet the people among whom such books are published wonder how it comes to pass that the civil magistrate daily loseth his authority, that the laws are trampled upon, and the subject in constant fear of being robbed and murdered, or having his house burnt over his head?

It may be presumed that the science of finding fault, which above all others is easiest to learn, suits best with a modern

[23] [It is not reason candidly proposed that offends, but the reviling, insulting, ridiculing, of the national laws and religion; all this profiteth for free-thinking, and must needs be offensive to all reasonable men.]—Author.

[24] [Vol. III. *Miscel.* III. cap. 2.]—Author.

[25] [*Inquiry into the Origin of Moral Virtue.* Ed. VI. p. 37.]—Author.

[26] [The author's *Remarks* on his *Fable of the Bees*, p. 379.]—Author.

[27] [*Remarks*, part II. p. 155.]—Author.

education. Too many there are of better fortunes than understandings, who have made the inquiry after truth a very small part of their care; these see somewhat, but not enough. It were to be wished they knew either less or more. One thing it is evident they do not know; to wit, that while they rail at prejudice, they are undoing themselves: they do not comprehend (what hath been before hinted), that their whole figure, their political existence, is owing to certain vulgar prejudices, in favour of birth, title, or fortune, which add nothing of real worth either to mind or body; and yet cause the most worthless person to be respected.

Freedom of thought is the prerogative of human kind; it is a quality inherent in the very nature of a thinking being. Nothing is more evident than that every one can think his own way, in spite of any outward force or power whatsoever. It is therefore ridiculous for any man to declaim in defence of a privilege which cannot be denied or taken from him. But this will not infer a boundless freedom of speech[28], an open contempt of laws, and a prescribing from private judgment[29] against public authority, things never borne in any well-ordered state; and which make the crying distemper of our times.

[[30]The constitution of these kingdoms hath been one while overheated by the indiscreet zeal of one set of men: Again it hath been cold and lifeless through the indifference of another. [31]We have alternately felt the furious effects of superstition and fanaticism; and our present impending danger is from the setting up of private judgment, or an inward light in opposition to human and divine laws. Such an inward conceited principle always at work, and proceeding gradually and steadily, may be sufficient to dissolve any human fabric of polity or civil government. To pretend to be wiser than the laws hath never been suffered in any wise State, saith Aristotle[32]. And indeed what wise State

[28] [Is there no difference between indulging scrupulous consciences, and tolerating public deriders of all conscience and religion?]—Author.

[29] [A man who is himself permitted to follow his own private judgment, cannot well complain, although he may not set it up as a public rule.]—Author.

[30] The two paragraphs within brackets, contained in the *Discourse* in the London edition of the *Miscellany,* are omitted in the Dublin edition, published in the same year, and also in the former Collected Editions of Berkeley's *Works.*

[31] [There is a medium in things, which wise men find out, while the unwise are always blundering in extremes.]—Author.

[32] [*Rhet.* lib. I. cap. 15.]—Author.

would encourage or endure a spirit of opposition[33] publicly to operate against its own decrees? who can say to such a spirit, Thus far shalt thou come, and no farther?

The Magistrate, perhaps, may not be sufficiently aware that those pretended advocates for private light and free thought are in reality seditious men, who set up themselves against national laws and constitutions. And yet, one would think, all mankind might see, that the spirit which prevails against the Church and Religion proceeds from an opposition rather to the laws of the land than to the Gospel. Men quarrel not so vehemently against articles of Faith themselves, as against the establishing of such matters; which is the sole effect of law and the supreme power. It clearly follows, the freedom pleaded for is not so much freedom of thought against the doctrines of the Gospel, as freedom of speech and action against the laws of the land. It is strange, that those who are not blind in other matters, should yet not see this; or, that seeing it, they should not discern the consequences thereof.]

I am sensible, that whatever looks like a restraint on freedom of inquiry, must be very disagreeable to all reasoning and inquisitive men. But against this I have said nothing[34]. On the contrary, I will freely own, a judicious and impartial search after truth is the most valuable employment of the mind. Those who have the talents, and will be at the pains, cannot do better than engage in that noble pursuit. But those who are not qualified by age or education; those who have neither disposition nor leisure, nor faculties to dig in the mine of truth themselves, must take it as retailed out by others. I see no remedy. God, who knows the opportunities of every man, requires impossibilities from no man. And where there is a sincere love of truth and virtue, the grace of God can easily supply the defect of human means.

It hath been before observed, and shewed at large, that the bulk of mankind must have their minds betimes imbued with good and wholesome notions or principles, by their parents, pastors, and tutors, or else bad notions, hurtful to themselves and others, will undoubtedly take possession thereof. Such bad

[33] [Reason modestly pleading from a conscientious principle hath nothing cruel to apprehend from our laws, and I hope it never will. At the same time, it must be allowed, that every plea against law ought to be very meek and modest.]—AUTHOR.

[34] [The profane and lawless scorner is one thing, and the modest inquirer after truth another.]—AUTHOR.

notions have, for several years past, been propagated with uncommon industry in these kingdoms: they now bring forth fruit every day more and more abundant. It is to be feared that what hath been long ripening is now near ripe. Many are the signs and tokens. He that runs may read.

But there cannot be a higher or more flagrant symptom of the madness of our times than that execrable Fraternity of Blasphemers, lately set up within this city of Dublin[35]. Blasphemy against God is a great crime against the state. But that a set of men should, in open contempt of the laws, make this very crime their profession, distinguish themselves by a peculiar name[36], and form a distinct Society, whereof the proper and avowed business shall be, to shock all serious Christians by the most impious and horrid blasphemies, uttered in the most public manner: this surely must alarm all thinking men. It is a new thing under the sun reserved for our worthy times and country.

It is no common blasphemy I speak of: it is not simple cursing and swearing: it is not the effect either of habit or surprise; but a train of studied, deliberate indignities against the Divine Majesty; and those of so black and hellish a kind as the tongues alone which uttered them can duly characterise and express. This is no speculative heresy, no remote or doubtful inference from an author's tenets. It is a direct and open attack on God himself. It is such a calm premeditated insult upon religion, law, and the very light of nature that there is no sect or nation of men—whether Christians, Jews, Mahometans, or even civilized heathens—that would not be struck with horror and amazement at the thought of it, and that would not animadvert[37] on its authors with the utmost severity.

Deliberate, atheistical blasphemy, is of all crimes most dangerous to the public, inasmuch as it opens the door to all other crimes, and virtually contains them all;—a religious awe and fear of God, being (as we have already observed) the centre that unites, and the cement that connects all human society.

[35] The *Discourse to Magistrates* seems to have been written as well as published in Dublin. Berkeley delivered his sentiments on this subject in the Irish House of Lords, upon the only occasion on which he spoke there, when his secluded life at Cloyne was interrupted by a single visit to Dublin.

[36] [Blasters.]—AUTHOR.

[37] [They (if there be any such) who think to serve the Reformation, by joining with Blasters and devil-worshippers in a plea for licence, are in truth a scandal and reproach to the protestant cause.]—AUTHOR.

He who makes it his business to lessen or root out from the minds of men this principle doth in effect endeavour to fill his country with highwaymen, housebreakers, murderers, fraudulent dealers, perjured witnesses, and every other pest of society. Therefore, it would be the greatest cruelty to our children, neighbours, and country to connive at such a crime; a crime which hath no natural passion or temptation to plead for it, but is the pure effect of an abandoned impudence in wickedness; and, perhaps, of a mistaken hope that the laws and magistrates are asleep.

The question is not now, whether religion shall be established by law: the thing is already done (and done with good reason, as appeareth from the premises), but whether a reverence[38] for the laws shall be preserved. Religion, considered as a system of saving truths, hath its sanction from heaven; its rewards and penalties are divine. But religion, as useful and necessary to society, hath been wisely established by law; and so established, and wrought into the very frame and principles of our government, is become a main part of the civil constitution. Our laws are the laws of a Christian country: our government hath been constituted and modelled by Christians; and is still administered and maintained by men professing belief in Christ. Can it then be supposed that impious men shall with impunity invent and[39] publicly utter the most horrid blasphemies; and, at the same time the whole constitution not be endangered? Or can it be supposed that magistrates, or men invested with power, should look on, and see the most sacred part of our constitution trampled under foot, and yet imagine their own dignity and authority to be secure, which rest entirely thereupon? I will venture to say that whoever is a wise man, and a lover of his country, will not only be solicitous to preserve the honour of God sacred and entire; he will even discourage that prevailing prejudice against the dispensers of God's word, the teachers of those salutary doctrines, without which the public cannot thrive or subsist. He will be

[38] [They who plead a right to contradict the laws, can pretend none for doing it with insolence or disrespect.]—AUTHOR.

[39] [To make the cause of such men the cause of liberty or toleration would be monstrous. A man is not suffered publicly to blaspheme, therefore he may not think freely: a profane miscreant is not indulged in the public worship of the devil, therefore a conscientious person may not serve God his own way;—is not this absurd?]—AUTHOR.

no contemner, not even of those rites and ordinances enjoined by law, as necessary to imprint and retain a sense of religion in the minds of men. He will extend his care to the outworks, as knowing that when these are gone, it may be difficult to preserve the rest.

Notwithstanding the vain assertion of those men who would justify the present by saying 'all times are alike,' it is most evident that the magistrates, the laws, the very constitution of these realms have lost no small share of their authority and reverence, since this great growth and spreading of impious principles. Whatever be the cause, the effect is apparent. Whether we ascribe it to the natural course of things, or to a just judgment upon those who, having been careless to preserve a due sense of the Divine authority, have seen and shall see their own despised.

Darius, a heathen prince, made a decree, that in every dominion of his kingdom men should tremble and fear before God (Dan. vi. 26). Nebuchadnezzar, likewise, another heathen, made a decree, that every people, nation, and language which spoke anything amiss against God should be cut in pieces, and their houses made a dunghill (Dan. iii. 29). And if these things were done in Persia and Babylon, surely it may be expected that impious blasphemers against God and his worship should at least be discouraged and put out of countenance in these Christian countries. Now, a constant course of disfavour from men in authority would prove a most effectual check to all such miscreants. When, therefore, they are public and bold in their blasphemies, this is no small reflection on those who might check them if they would.

It is not so much the execution of the laws as the countenance of those in authority that is wanting to the maintenance of religion. If men of rank and power, who have a share in distributing justice, and a voice in the public councils, shall be observed to neglect divine worship themselves, it must needs be a great temptation for others to do the same. But if they and their families should set a good example, it may be presumed that men of less figure would be disposed to follow it. Fashions are always observed to descend, and people are generally fond of being in the fashion; whence one would be apt to suspect the prevailing contempt of God's word, and estrangement from his house, to a degree that was never known in any Christian country,

must take its rise from the irreligion and bad example of those who are styled 'the better sort.'

Offences must come, but woe be to him by whom the offence cometh. A man who is entrusted with power and influence in his country hath much to answer for, if religion and virtue suffer through want of his authority and countenance. But, in case he should, by the vanity of his discourse, his favour to wicked men, or his own apparent neglect of all religious duties, countenance what he ought to condemn, and authorise by his own example what he ought to punish; such a one, whatever he may pretend, is in fact a bad patriot, a bad citizen, and a bad subject, as well as a bad Christian.

Our prospect is very terrible, and the symptoms grow stronger every day. The morals of a people are in this like their fortunes; when they feel a national shock, the worst doth not shew itself immediately. Things make a shift to subsist for a time on the credit of old notions and dying opinions. But the youth born and brought up in wicked times, without any bias to good from early principle or instilled opinion, when they grow ripe must be monsters indeed. And it is to be feared, that age of monsters is not far off.

Whence this impiety springs, by what means it gains ground among us, and how it may be remedied, are matters that deserve the attention of all those who have the power and the will to serve their country. And although many things look like a prelude to general ruin; although it is much to be apprehended, we shall be worse before we are better; yet who knows what may ensue, if all persons in power, from the supreme executor of the law down to a petty constable, would, in their several stations, behave themselves like men truly conscious and mindful that the authority they are clothed with is but a ray derived from the supreme authority of Heaven? This may not a little contribute to stem that torrent, which, from small beginnings, and under specious pretences, hath grown to such a head, and daily gathers force more and more, to that degree as threatens a general inundation and destruction of these realms.

A LETTER

TO THE

ROMAN CATHOLICS OF THE DIOCESE OF CLOYNE.

PUBLISHED IN THE LATE REBELLION, A.D. 1745.

A LETTER

TO THE ROMAN CATHOLICS OF THE DIOCESE OF CLOYNE.

My Countrymen and Fellow-Subjects,

Notwithstanding the differences of our religious opinions, I should be sorry to be wanting in any instance of humanity or good neighbourhood to any of you. For which reason I find myself strongly inclined, at this critical juncture, to put you in mind that you have been treated with a truly Christian lenity under the present government; that your persons have been protected, and your properties secured by equal laws: and that it would be highly imprudent as well as ungrateful to forfeit these advantages, by making yourselves tools to the ambition of foreign princes, who fancy it expedient to raise disturbances among us at present, but, as soon as their own ends are served, will not fail to abandon you, as they have always done.

Is it not evident that your true interest consists in lying still, and waiting the event, since Ireland must necessarily follow the fate of England; and that therefore prudence and policy prescribe quiet to the Roman Catholics of this kingdom, who, in case a change of hands should not succeed after your attempting to bring it about, must then expect to be on a worse foot than ever?

But we will suppose it succeeds to your wish. What then? Would not this undermine even your own interests and fortune, which are often interwoven with those of your neighbours? Would not all those who have debts or money, or other effects in the hands of Protestants, be fellow-sufferers with them? Would not all those who hold under the Acts of Settlement be as liable as Protestants themselves to be dispossessed by the old proprietors? Or, can even those who are styled proprietors flatter themselves with hopes of possessing the estates which they claim,

which, in all likelihood, would be given to favourites (perhaps to foreigners), who are near the person, or who fought the battles of their Master.

Under protestant governments, those of your communion have formerly enjoyed a greater share of the lands of this kingdom, and more ample privileges. You bore your part in the magistracy and the legislature, and could complain of no hardships on the score of your religion. If these advantages have been since impaired or lost, was it not by the wrong measures yourselves took to enlarge them, in several successive attempts, each of which left you weaker and in a worse condition than you were before? And this notwithstanding the vaunted succours of France and Spain, whose vain efforts in conjunction with yours constantly recoiled on your own heads, even when your numbers and circumstances were far more considerable than they now are?

You all know these things to be true. I appeal to your own breasts. Dear-bought experience hath taught you, and past times instruct the present. But perhaps you follow conscience rather than interest. Will any men amongst you pretend to plead conscience against being quiet, or against paying allegiance and peaceable submission to a protestant prince, which the first Christians paid even to heathen, and which those of your communion, at this day, pay to Mahometan and to idolatrous princes in Turkey and China, and which you yourselves have so often professed to pay to our present gracious Sovereign? Conscience is quite out of the case. And what man in his senses would engage in a dangerous course, to which neither interest doth invite, nor conscience oblige him?

I heartily wish that this advice may be as well taken as it is meant, and that you may maturely consider your true interest, rather than rashly repeat the same errors which you have so often repented of. So, recommending you to the merciful guidance of Almighty God, I subscribe myself,

Your real well-wisher,

GEORGE CLOYNE.

A WORD TO THE WISE:

OR,

AN EXHORTATION

TO THE

ROMAN CATHOLIC CLERGY OF IRELAND.

Homo sum, humani nihil a me alienum puto.

1749.

A WORD TO THE WISE[1].

Be not startled, Reverend Sirs, to find yourselves addressed to by one of a different Communion. We are indeed (to our shame be it spoken) more inclined to hate for those articles wherein we differ, than to love one another for those wherein we agree. But, if we cannot extinguish, let us at least suspend our animosities, and, forgetting our religious feuds, consider ourselves in the amiable light of countrymen and neighbours. Let us for once turn our eyes on those things in which we have one common interest. Why should disputes about faith interrupt the duties of civil life? or the different roads we take to heaven prevent our taking the same steps on earth? Do we not inhabit the same spot of ground, breathe the same air, and live under the same government? Why, then, should we not conspire in one and the same design—to promote the common good of our country.

We are all agreed about the usefulness of meat, drink, and clothes, and, without doubt, we all sincerely wish our poor neighbours were better supplied with them. Providence and nature have done their part; no country is better qualified to furnish the necessaries of life, and yet no people are worse provided. In vain is the earth fertile, and the climate benign, if human labour be wanting. Nature supplies the materials, which art and industry improve to the use of man, and it is the want of this industry that occasions all our other wants.

The public hath endeavoured to excite and encourage this most

[1] The *Word to the Wise* was first published in 1749. I have not found a copy of the original edition. It was republished, in conjunction with the *Querist*, in the following year, and also in 1751. It is contained in the *Miscellany*. This impassioned exhortation to inculcate Industry on the people of Ireland may be compared with the *Essay towards preventing the Ruin of Great Britain*, written nearly thirty years earlier, and also with the *Querist*.

useful virtue. Much hath been done; but whether it be from the heaviness of the climate, or from the Spanish or Scythian blood that runs in their veins, or whatever else may be the cause, there still remains in the natives of this island a remarkable antipathy to labour. You, gentlemen, can alone conquer their innate hereditary sloth. Do you then, as you love your country, exert yourselves.

You are known to have great influence on the minds of your people; be so good as to use this influence for their benefit. Since other methods fail, try what *you* can do. 'Be instant in season, out of season; reprove, rebuke, exhort' (2 Tim. iv. 2). Make them thoroughly sensible of the sin and folly of sloth. Shew your charity in clothing the naked and feeding the hungry, which you may do by the mere breath of your mouths. Give me leave to tell you that no set of men upon earth have it in their power to do good on easier terms, with more advantage to others, and less pains or loss to themselves. Your flocks are of all others most disposed to follow directions, and of all others want them most; and indeed what do they not want?

The house of an Irish peasant is the cave of poverty; within, you see a pot and a little straw; without, a heap of children tumbling on the dunghill. Their fields and gardens are a lively counterpart of Solomon's description in the Proverbs: 'I went (saith that wise king) by the field of the slothful, and by the vineyard of the man void of understanding; and, lo, it was all grown over with thorns, and nettles had covered the face thereof, and the stone wall thereof was broken down' (Prov. xxiv. 30, 31). In every road the ragged ensigns of poverty are displayed; you often meet caravans of poor, whole families in a drove, without clothes to cover, or bread to feed them, both which might be easily procured by moderate labour. They are encouraged in this vagabond life by the miserable hospitality they meet with in every cottage, whose inhabitants expect the same kind reception in their turn when they become beggars themselves; beggary being the last refuge of these improvident creatures.

If I seem to go out of my province, or to prescribe to those who must be supposed to know their own business, or to paint the lower inhabitants of this land in no very pleasing colours, you

will candidly forgive a well-meant zeal, which obligeth me to say things rather useful than agreeable, and to lay open the sore in order to heal it.

But whatever is said must be so taken as not to reflect on persons of rank and education, who are no way inferior to their neighbours; nor yet to include all even of the lowest sort, though it may well extend to the generality of those especially in the western and southern parts of the kingdom, where the British manners have less prevailed. We take our notions from what we see, mine are a faithful transcript from originals about me.

The Scythians were noted for wandering, and the Spaniards for sloth and pride; our Irish are behind neither of these nations from which they descend, in their respective characteristics. 'Better is he that laboureth and aboundeth in all things, than he that boasteth himself and wanteth bread,' saith the son of Sirach (x. 27); but so saith not the Irishman. In my own family a kitchen-wench refused to carry out cinders, because she was descended from an old Irish stock. Never was there a more monstrous conjunction than that of pride with beggary; and yet this prodigy is seen every day in almost every part of this kingdom. At the same time these proud people are more destitute than savages, and more abject than negroes. The negroes in our Plantations have a saying—'If negro was not negro, Irishman would be negro.' And it may be affirmed with truth that the very savages of America are better clad and better lodged than the Irish cottagers throughout the fine fertile counties of Limerick and Tipperary.

Having long observed and bewailed this wretched state of my countrymen, and the insufficiency of several methods set on foot to reclaim them, I have recourse to your Reverences as the *dernier ressort*. Make them to understand that you have their interest at heart, that you persuade them to work for their own sakes, and that God hath ordered matters so as that they who will not work for themselves must work for others. The terrors of debt, slavery, and famine should, one would think, drive the most slothful to labour. Make them sensible of these things, and that the ends of Providence and order of the world require industry in human creatures. 'Man goeth forth to his work and to his labour until

the evening,' saith the Psalmist (Ps. civ. 23), when he is describing the beauty, order, and perfection of the works of God. But what saith the slothful person? 'Yet a little sleep, a little slumber, a little folding of the hands to sleep' (Prov. vi. 10). But what saith the wise man? 'So shall thy poverty come as one that travelleth, and thy want as an armed man' (Prov. vi. 11).

All nature will furnish you with arguments and examples against sloth: 'Go to the ant, thou sluggard,' cries Solomon. The ant, the bee, the beetle, and every insect but the drone, read a lesson of industry to man. But the shortest and most effectual lesson is that of St. Paul: 'If any man will not work, neither should he eat' (2 Thess. iii. 10). This command was enjoined the Thessalonians, and equally respects all Christians, and indeed all mankind; it being evident by the light of nature that the whole creation works together for good, and that no part was designed to be useless. As therefore the idle man is of no use, it follows that he hath no right to a subsistence. 'Let them work (saith the apostle), and eat their own bread' (2 Thess. iii. 12); not bread got by begging, nor bread earned by the sweat of other men; but their own bread, that which is got by their own labour. 'Then shalt thou eat the labour of thine hands,' saith the Psalmist; to which he adds, 'Happy shalt thou be, and it shall be well with thee' (Ps. cxxviii. 2), intimating that to work and enjoy the fruits thereof is a great blessing.

A slothful man's imagination is apt to dress up labour in a horrible mask; but, horrible as it is, idleness is more to be dreaded, and a life of poverty (its necessary consequence) is far more painful. It was the advice of Pythagoras, to choose the best kind of life; for that use would render it agreeable, reconciling men even to the roughest exercise. By practice, pains become at first easy, and in the progress pleasant; and this is so true, that whoever examines things will find there can be no such thing as happy life without labour, and that whoever doth not labour with his hands, must, in his own defence, labour with his brains.

Certainly, planting and tilling the earth is an exercise not less pleasing than useful; it takes the peasant from his smoky cabin into the fresh air and the open field, rendering his lot far more desirable than that of the sluggard, who lies in the straw, or sits whole days by the fire.

Convince your people that not only pleasure invites but necessity also drives them to labour. If you have any compassion for these poor creatures, put them in mind how many of them perished in a late memorable distress[2], through want of that provident care against a hard season, observable not only in all other men, but even in irrational animals. Set before their eyes, in lively colours, their own indigent and sordid lives, compared with those of other people, whose industry hath procured them hearty food, warm clothes, and decent dwellings. Make them sensible what a reproach it is that a nation which makes so great pretensions to antiquity, and is said to have flourished many ages ago in arts and learning, should in these our days turn out a lazy, destitute, and degenerate race.

Raise your voices, Reverend Sirs, exert your influence, shew your authority over the multitude, by engaging them to the practice of an honest industry—a duty necessary to all, and required in all, whether Protestants, or Roman Catholics, whether Christians, Jews, or Pagans. Be so good, among other points, to find room for *this*, than which none is of more concern to the souls and bodies of your hearers, nor consequently deserves to be more amply or frequently insisted on.

Many and obvious are the motives that recommend this duty. Upon a subject so copious you can never be at a loss for something to say. And while, by these means, you rescue your countrymen from want and misery, you will have the satisfaction to behold your country itself improved. What pleasure must it give you, to see these waste and wild scenes, these naked ditches, and miserable hovels, exchanged for fine plantations, rich meadows, well-tilled fields, and neat dwellings; to see people well fed, and well clad, instead of famished, ragged scarecrows; and those very persons tilling the fields that used to beg in the streets.

Neither ought the difficulty of the enterprise to frighten you from attempting it. It must be confessed, a habit of industry is not at once introduced; neighbour, nevertheless, will emulate neighbour, and the contagion of good example will spread as surely as of bad, though perhaps not so speedily. It may be hoped there are many that would be allured by a plentiful and decent

[2] He refers probably to the famine which followed the hard frost in 1740. Thousands perished of hunger and disease in that and the following year.

manner of life to take pains, especially when they observe it to be attained by the industry of their neighbours, in no sort better qualified than themselves.

If the same gentle spirit of sloth did not soothe our squires as well as peasants, one would imagine there should be no idle hands among us. Alas! how many incentives to industry offer themselves in this island, crying aloud to the inhabitants for work? Roads to be repaired, rivers made navigable, fisheries on the coasts, mines to be wrought, plantations to be raised, manufactures improved, and, above all, lands to be tilled, and sowed with all sorts of grain.

When so many circumstances provoke and animate your people to labour; when their private wants, and the necessities of the public; when the laws, the magistrates, and the very country calls upon them; you cannot think it becomes you alone to be silent, or hindmost in every project for promoting the public good. Why should you, whose influence is greatest, be least active? Why should you, whose words are most likely to prevail, say least in the common cause?

Perhaps it will be said, the discouragements attending those of your Communion[3] are a bar against all endeavours for exciting them to a laudable industry. Men are stirred up to labour by the prospect of bettering their fortunes, by getting estates, or employments; but those who are limited in the purchase of estates, and excluded from all civil employments, are deprived of those spurs to industry.

To this it may be answered, that, admitting these considerations do, in some measure, damp industry and ambition in persons of a certain rank, yet they can be no let to the industry of poor people, or supply an argument against endeavouring to procure meat, drink, and clothes. It is not proposed that you should persuade the better sort to acquire estates, or qualify themselves for becoming magistrates; but only that you should set the lowest of the people at work, to provide themselves with necessaries, and supply the wants of nature.

It will be alleged in excuse of their idleness, that the country

[3] Note the reference here, and in what follows, to the civil disabilities of the Irish Roman Catholics, and to the Irish land question. Cf. *Querist*, Qu. 255.

people want encouragement to labour, as not having a property in the lands. There is small encouragement, say you, for them to build or plant upon another's land, wherein they have only a temporary interest. To which I answer, that life itself is but temporary; that all tenures are not of the same kind; that the case of our English and the original Irish is equal in this respect; and that the true Aborigines, or natural Irish, are noted for want of industry in improving even on their own lands, whereof they have both possession and property.

How many industrious persons are there in all civilized countries, without any property in lands, or any prospect of estates, or employments! Industry never fails to reward her votaries. There is no one but can earn a little, and little added to little makes a heap. In this fertile and plentiful island, none can perish for want but the idle and improvident. None who have industry, frugality, and foresight but may get into tolerable, if not wealthy, circumstances.—Are not all trades and manufactures open to those of your Communion? Have you not the same free use, and may you not make the same advantage, of fairs and markets as other men? Do you pay higher duties, or are you liable to greater impositions, than your fellow-subjects? And are not the public premiums and encouragements given indifferently to artists of all Communions? Have not, in fact, those of your Communion a very great share of the commerce of this kingdom in their hands? And is not more to be got by this than by purchasing estates, or possessing civil employments, whose incomes are often attended with large expenses?

A tight house, warm apparel, and wholesome food, are sufficient motives to labour. If all had them, we should be a flourishing nation. And if those who take pains may have them, those who will not take pains are not to be pitied; they are to be looked on and treated as drones, the pest and disgrace of society.

It will be said, the hardness of the landlord cramps the industry of the tenant. But if rent be high, and the landlord rigorous, there is more need of industry in the tenant. It is well known that in Holland taxes are much higher, and rent both of land and houses far dearer, than in Ireland. But this is no objection or impediment to the industry of the people, who are rather animated

and spurred on to earn a livelihood by labour, that is not to be got without it.

You will say, it is an easy matter to make a plausible discourse on industry, and its advantages; but what can be expected for poor creatures, who are destitute of all conveniences for exerting their industry, who have nothing to improve upon, nothing to begin the world with? I answer, they have their four quarters, and five senses [4]. Is it nothing to possess the bodily organs sound and entire? That wonderful machine, the hand, was it formed to be idle?

Was there but will to work, there are not wanting in this island either opportunities or encouragements. Spinning alone might employ all idle hands (children as well as parents), being soon learned, easily performed, and never failing of a market, requiring neither wit nor strength, but suited to all ages and capacities. The public provides utensils, and persons for teaching the use of them; but the public cannot provide a heart and will to be industrious. These, I will not deny, may be found in several persons in some other parts of the kingdom, and wherever they are found, the comfortable effects shew themselves. But seldom, very seldom, are they found in these southern people, whose indolence figureth a lion in the way, and is proof against all encouragement.

But you will insist, how can a poor man, whose daily labour goes for the payment of his rent, be able to provide present necessaries for his family, much less to lay up a store for the future? It must be owned, a considerable share of the poor man's time and labour goes towards paying his rent. But how are his wife and children employed, or how doth he employ himself the rest of his time? The same work tires, but different works relieve. Where there is a true spirit of industry, there will never be wanting something to do, without doors or within, by candle-light if not by day-light. *Labor ipse voluptas*, saith the poet, and this is verified in fact.

In England, when the labour of the field is over, it is usual for men to betake themselves to some other labour of a different kind. In the northern parts of that industrious land, the

[4] Cf *Querist*, Qu. 4.

inhabitants meet, a jolly crew, at one another's houses, where they merrily and frugally pass the long and dark winter evenings; several families, by the same light and the same fire, working at their different manufactures of wool, flax, or hemp; company, meanwhile, mutually cheering and provoking to labour. In certain other parts you may see [5], on a summer's evening, the common labourers sitting along the streets of a town or village, each at his own door, with a cushion before him making bone-lace, and earning more in an evening's pastime than an Irish family would in a whole day. Those people, instead of closing the day with a game on greasy cards, or lying stretched before the fire, pass their time much more cheerfully in some useful employment, which custom hath rendered light and agreeable.

But admitting, for the various reasons above alleged, that it is impossible for our cottagers to be rich, yet it is certain they may be clean. Now, bring them to be cleanly, and your work is half done. A little washing, scrubbing, and rubbing, bestowed on their persons and houses, would introduce a sort of industry; and industry in any one kind is apt to beget it in another.

Indolence in dirt is a terrible symptom, which shews itself in our lower Irish more, perhaps, than in any people on this side the Cape of Good Hope. I will venture to add that look throughout the kingdom, and you shall not find a clean house inhabited by cleanly people, and yet wanting necessaries; the same spirit of industry that keeps folk clean, being sufficient to keep them also in food and raiment [6].

But, alas! our poor Irish are wedded to dirt upon principle. It is with some of them a maxim that the way to make children thrive is to keep them dirty. And I do verily believe that the familiarity with dirt, contracted and nourished from their infancy, is one great cause of that sloth which attends them in every stage of life. Were children but brought up in an abhorrence of dirt, and obliged to keep themselves clean, they would have something to do, whereas they now do nothing.

It is past all doubt that those who are educated in a supine

[5] [*e.g.* Newport Pagnel in Buckinghamshire.]—Author. [6] Cf. *Querist*, Qu. 60, 61.

neglect of all things, either profitable or decent, must needs contract a sleepiness and indolence, which doth necessarily lead to poverty, and every other distress that attends it. 'Love not sleep (cries Solomon), lest thou come to poverty; open thine eyes and thou shalt be satisfied with bread' (Prov. xx. 13). It is therefore greatly to be wished, that you would persuade parents to inure their children betimes to a habit of industry, as the surest way to shun the miseries that must otherwise befal them.

An early habit, whether of sloth or diligence, will not fail to shew itself throughout the whole course of a man's life. 'Train up a child (saith the wise man) in the way he should go, and when he is old he will not depart from it' (Prov. xxii. 6). The first tincture often leaves so deep a stain as no afterthought or endeavour can wash out. Hence sloth in some minds is proof against all arguments and examples whatsoever, all motives of interest and duty, all impressions even of cold and hunger. This habit, rooted in the child, grows up and adheres to the man, producing a general listlessness, and aversion from labour. This I take to be our great calamity.

For, admitting that some of our squires and landlords are vultures with iron bowels, and that their hardness and severity are a great discouragement to the tenant, who will naturally prefer want and ease before want and toil; it must at the same time be admitted that neither is the landlord, generally speaking, so hard, nor the climate so severe, nor the soil so ungrateful, as not to answer the husbandman's labour, where there is a spirit of industry; the want of which is the true cause of our national distress. Of this there are many evident proofs.

I have myself known a man, from the lowest condition of life, without friends or education, not knowing so much as to write or read, bred to no trade or calling, by pure dint of day-labour, frugality, and foresight, to have grown wealthy, even in this island, and under all the above-mentioned disadvantages. And what is done by one, is possible to another.

In Holland[7] a child five years old is maintained by its own labour; in Ireland many children of twice that age do nothing but steal, or encumber the hearth and dunghill. This shameful

[7] Cf. *Querist*, Qu. 373.

neglect of education shews itself through the whole course of their lives, in a matchless sloth bred in the very bone, and not to be accounted for by any outward hardship or discouragement whatever. It is the native colour, if we may so speak, and complexion of the people. Dutch, English, French, or Flemish cannot match them.

Mark an Irishman at work in the field; if a coach or horseman go by, he is sure to suspend his labour, and stand staring until they are out of sight. A neighbour of mine made it his remark in a journey from London to Bristol, that all the labourers of whom he inquired the road constantly answered without looking up, or interrupting their work, except one who stood staring and leaning on his spade, and him he found to be an Irishman.

It is a shameful thing, and peculiar to this nation, to see lusty vagabonds strolling about the country, and begging without any pretence to beg. Ask them why they do not labour to earn their own livelihood, they will tell you, They want employment; offer to employ them, and they shall refuse your offer; or, if you get them to work one day, you may be sure not to see them the next. I have known them decline even the lightest labour, that of hay-making, having at the same time neither clothes for their backs, nor food for their bellies.

A sore leg is an estate to such a fellow; and this may be easily got, and continued with small trouble. Such is their laziness, that rather than work they will cherish a distemper. This I know to be true, having seen more than one instance wherein the second nature so far prevailed over the first, that sloth was preferred to health. To these beggars, who make much of their sores, and prolong their diseases, you cannot do a more thankless office than cure them, except it be to shave their beards, which conciliate a sort of reverence to that order of men.

It is indeed a difficult task to reclaim such fellows from their slothful and brutal manner of life, to which they seem wedded with an attachment that no temporal motives can conquer; nor is there, humanly speaking, any hopes they will amend, except their respect for your lessons and fear of something beyond the grave be able to work a change in them.

Certainly, if I may advise, you should, in return for the lenity and indulgence of the government, endeavour to make yourselves useful to the public; and this will best be performed, by rousing your poor countrymen from their beloved sloth. I shall not now dispute the truth or importance of other points, but will venture to say, that you may still find time to inculcate this doctrine of an *honest industry*; and that this would by no means be time thrown away, if promoting your country's interest, and rescuing so many unhappy wretches of your Communion from beggary or the gallows, be thought worthy of your pains.

It should seem you cannot in your sermons do better than inveigh against idleness, that extensive parent of many miseries and many sins; idleness, the mother of hunger and sister of theft: 'idleness,' which, the Son of Sirach assures us, 'teacheth many vices.'

The same doctrine is often preached from the gallows. And indeed the poverty, nakedness, and famine which idleness entaileth on her votaries, do make men so wretched, that they may well think it better to die than to live such lives. Hence a courage for all villanous undertakings, which, bringing men to a shameful death, do then open their eyes when they are going to be closed for ever.

If you have any regard (as it is not to be doubted) either for the souls or bodies of your people, or even for your own interest and credit, you cannot fail to inveigh against this crying sin of your country. Seeing you are obnoxious to the laws, should you not in prudence try to reconcile yourselves to the favour of the public; and can you do this more effectually, than by co-operating with the public spirit of the legislature, and men in power?

Were this but done heartily, would you but 'be instant in season, and out of season, reprove, rebuke, exhort' (2 Tim. iv. 2), such is the ascendant you have gained over the people that we might soon expect to see the good effects thereof. We might hope 'that our garners would be soon full, affording all manner of store, that our sheep would bring forth thousands, that our oxen would be strong to labour, that there would be no breaking in, nor going out (no robbery, nor migration for bread), and that there would be no complaining in our streets' (Ps. cxliv. 13).

It stands upon you to act with vigour in this cause, and shake off the shackles of sloth from your countrymen, the rather, because there be some who surmise that yourselves have put them on. Right or wrong, men will be apt to judge of your doctrines by their fruits. It will reflect small honour on their teachers, if, instead of honesty and industry, those of your Communion are peculiarly distinguished by the contrary qualities, or if the nation converted by the great and glorious St. Patrick should, above all other nations, be stigmatized and marked out as good for nothing.

I can never suppose you so much your own enemies as to be friends to this odious sloth. But, were this once abolished, and a laudable industry introduced in its stead, it may perhaps be asked, who are to be gainers? I answer, your Reverences are like to be great gainers; for every penny you now gain you will gain a shilling: you would gain also in your credit: and your lives would be more comfortable.

You need not be told how hard it is to rake from rags and penury a tolerable subsistence; or how offensive to perform the duties of your function amidst stench and nastiness; or how much things would change for the better, in proportion to the industry and wealth of your flocks. Duty as well as interest calls upon you to clothe the naked, and feed the hungry, by persuading them to 'eat (in the apostle's phrase) their own bread;' or, as the Psalmist expresseth it, 'the labour of their own hands.' By inspiring your flocks with a love of industry, you will at once strike at the root of many vices, and dispose them to practise many virtues. This therefore is the readiest way to improve them.

Consult your superiors. They shall tell you the doctrine here delivered is a sound Catholic doctrine, not limited to Protestants, but extending to all, and admitted by all, whether Protestants or Roman Catholics, Christians or Mahometans, Jews or Gentiles. And as it is of the greatest extent, so it is also of the highest importance. St. Paul expressly saith that 'if any provide not for his own, and especially for those of his own house, he hath denied the faith, and is worse than an infidel' (1 Tim. v. 8).

In vain, then, do you endeavour to make men orthodox in points of faith, if, at the same time, in the eyes of Christ and His apostles, you suffer them to be worse than infidels, than those

who have no faith at all. There is something it seems worse than even infidelity; and to incite and stimulate you to put away that cursed thing from among you is the design and aim of this Address. The doctrine we recommend is an evident branch of the Law of Nature; it was taught by prophets, inculcated by apostles, encouraged and enforced by philosophers, legislators, and all wise states, in all ages and in all parts of the world. Let me therefore entreat you to exert yourselves, 'to be instant in season, and out of season, rebuke, reprove, exhort.' Take all opportunities to drive the lion out of the way; raise your voices, omit no occasion, public or private, of awakening your wretched countrymen from their sweet dream of sloth.

Many suspect your religion to be the cause of that notorious idleness which prevails so generally among the natives of this island, as if the Roman Catholic faith were inconsistent with an honest diligence in a man's calling. But whoever considers the great spirit of industry that reigns in Flanders and France, and even beyond the Alps, must acknowledge this to be a groundless suspicion. In Piedmont and Genoa, in the Milanese and the Venetian state, and indeed throughout all Lombardy, how well is the soil cultivated, and what manufactures of silk, velvet, paper, and other commodities, flourish? The king of Sardinia will suffer no idle hands in his territories, no beggar to live by the sweat of another's brow; it has even been made penal at Turin to relieve a strolling beggar. To which I might add that the person whose authority will be of the greatest weight with you, even the pope himself, is at this day endeavouring to put new life into the trade and manufactures of his country.

Though I am in no secret of the Court of Rome, yet I will venture to affirm, that neither pope, nor cardinals, will be pleased to hear that those of their Communion are distinguished, above all others, by sloth, dirt, and beggary; or be displeased at your endeavouring to rescue them from the reproach of such an infamous distinction.

The case is as clear as the sun; what we urge is enforced by every motive that can work on a reasonable mind. The good of your country, your own private interest, the duty of your function, the cries and distresses of the poor, do with one voice call for your assistance. And, if it is on all hands allowed to

be right and just, if agreeable both to reason and religion, if coincident with the views both of your temporal and spiritual superiors, it is to be hoped this Address may find a favourable reception, and that a zeal for disputed points will not hinder your concurring to propagate so plain and useful a doctrine, wherein we are all agreed.

When a leak is to be stopped, or a fire extinguished, do not all hands co-operate without distinction of sect or party? Or if I am fallen into a ditch, shall I not suffer a man to help me out, until I have first examined his creed? Or when I am sick, shall I refuse the physic, because my physician doth or doth not believe the pope's supremacy?

Fas est et ab hoste doceri. But, in truth, I am no enemy to your persons, whatever I may think of your tenets. On the contrary, I am your sincere well-wisher. I consider you as my countrymen, as fellow-subjects, as professing belief in the same Christ. And I do most sincerely wish, there was no other contest between us but—who shall most completely practise the precepts of him by whose name we are called, and whose disciples we all profess to be.

[[8]Soon after the preceding Address was published, the Printer hereof received the following *Letter from the Roman Catholic Clergy of the Diocese of Dublin*, desiring it to be inserted in the *Dublin Journal* of November 18, 1749:—

'You will very much oblige many of your constant readers, if you acquaint the public that the Address you lately published, entitled, *A Word to the Wise; or an Exhortation to the Roman Catholic Clergy of Ireland*, was received by the Roman Catholic clergy of Dublin with the highest sense of gratitude; and they take the liberty, in this public manner, to return their sincere and hearty thanks to the worthy Author, assuring him that they are determined to comply with every particular recommended in it, to the utmost of their power. In every page it contains a proof of the author's extensive charity. His views are only towards the

[8] This *Letter* is appended to the *Word to the Wise*, in the edition published in Berkeley's *Miscellany*, in 1752—not in the preceding editions. It is omitted in all the Collected Editions of his *Works*.

public good. The means he prescribeth are easily complied with, and his manner of treating persons in their circumstances so very singular that they plainly shew the good man, the polite gentleman, and the true patriot. All this hath so great an effect upon them, that they have already directed circular Letters to the parish priests of this Diocese, recommending, in the most earnest manner, the perusal and zealous execution of what is contained in the said Address; and it is hoped that by publishing this in your Journal, the Roman Catholic clergy of other parts of this Kingdom will be induced to follow their example, which must promote the laudable views of that great and good man. At the same time, he may be assured that the Roman Catholic clergy of this city have frequently taken considerable pains to recommend to their respective flocks, industry, and a due application to their respective trades and callings, as an indispensable duty, and the means of avoiding the many vices and bad consequences which generally attend criminal poverty and want. But the more effectually to prevent these evils, and remove all excuses for sloth and idleness, they have, several months ago, pursuant to the example of many bishoprics in Lombardy, Spain, Naples, &c., taken the steps most proper and expedient, in their opinion, to lessen considerably the number of Holidays in this Kingdom; and they make no doubt but their expectations will, in a short time, be fully answered, to the great advantage of the public.'

'We are, &c.']

MAXIMS

CONCERNING

PATRIOTISM.

1750.

MAXIMS CONCERNING PATRIOTISM[1].

1. Every man, by consulting his own heart, may easily know whether he is or is not a patriot. But it is not so easy for the by-standers.

2. Being loud and vehement either against a court, or for a court, is no proof of patriotism.

3. A man whose passion for money runs high bids fair for being no patriot. And he likewise whose appetite is keen for power.

4. A native than a foreigner, a married man than a bachelor, a believer than an infidel, has a better chance for being a patriot.

5. It is impossible an epicure should be a patriot.

6. It is impossible a man who cheats at cards, or cogs the dice, should be a patriot.

7. It is impossible a man who is false to his friends and neighbours should be true to the public.

8. Every knave is a thorough knave. And a thorough knave is a knave throughout.

9. A man who hath no sense of God or conscience: would you make such a one guardian to your child? If not, why guardian to the state?

10. A sot, a beast, benumbed and stupefied by excess, is good for nothing, much less to make a patriot of.

11. A fop or man of pleasure makes but a scurvy patriot.

12. A sullen, churlish man, who loves nobody, will hardly love his country.

[1] These *Maxims* were first published in 1750, as it seems, in the *Dublin Journal*, but I have not been able to find a copy of the original edition. Berkeley was a patriot —not a *Pat-riot*, as he used to style his 'bawling' countrymen.

13. The love of praise and esteem may do something: but to make a true patriot there must be an inward sense of duty and conscience.

14. Honesty (like other things) grows from its proper seed, good principles early laid in the mind.

15. To be a real patriot, a man must consider his countrymen as God's creatures, and himself as accountable for his acting towards them.

16. If *pro aris et focis* be the life of patriotism, he who hath no religion or no home makes a suspected patriot.

17. No man perjures himself for the sake of conscience.

18. There is an easy way of reconciling malecontents.—*Sunt verba et voces quibus hunc lenire dolorem*, &c.

19. A good groom will rather stroke than strike.

20. He who saith there is no such thing as an honest man, you may be sure is himself a knave.

21. I have no opinion of your bumper patriots. Some eat, some drink, some quarrel, for their country. Modern Patriotism!

22. Ibycus is a carking, griping, closefisted fellow. It is odds that Ibycus is not a patriot.

23. We are not to think every clamorous haranguer, or every splenetic repiner against a court, is therefore a patriot.

24. A patriot is one who heartily wisheth the public prosperity, and doth not only wish, but also study and endeavour to promote it.

25. Gamesters, fops, rakes, bullies, stockjobbers: alas! what patriots!

26. Some writers have thought it impossible that men should be brought to laugh at public spirit. Yet this hath been done in the present age.

27. The patriot aims at his private good in the public. The knave makes the public subservient to his private interest. The former considers himself as part of a whole, the latter considers himself as the whole.

28. There is and ever will be a natural strife between court and country. The one will get as much, and the other give as little as it can. How must the patriot behave himself?

29. He gives the necessary. If he gives more, it is with a view of gaining more to his country.

30. A patriot will never barter the public money for his private gain.

31. Moral evil is never to be committed; physical evil may be incurred, either to avoid a greater evil, or to procure a good.

32. Where the heart is right, there is true patriotism.

33. In your man of business, it is easier to meet with a good head than a good heart.

34. A patriot will admit there may be honest men, and that honest men may differ.

35. He that always blames, or always praises is no patriot.

36. Were all sweet and sneaking courtiers, or were all sour malecontents; in either case the public would thrive but ill.

37. A patriot would hardly wish there was no contrast in the state.

38. Ferments of the worst kind succeed to perfect inaction.

39. A man rages, rails, and raves; I suspect his patriotism.

40. The fawning courtier and the surly squire often mean the same thing, each his own interest.

41. A patriot will esteem no man for being of his party.

42. The factious man is apt to mistake himself for a patriot.

THREE LETTERS TO THOMAS PRIOR, ESQ.,

AND

A LETTER TO THE REV. DR. HALES,

ON THE

VIRTUES OF TAR-WATER.

1744—1747.

LETTER

TO THOMAS PRIOR, ESQ.,

CONTAINING SOME FARTHER REMARKS ON THE VIRTUES OF TAR-WATER, AND THE METHODS FOR PREPARING AND USING[1] IT.

Non sibi, sed toti.

'Nothing is more difficult and disagreeable than to argue men out of their prejudices; I shall not, therefore, enter into controversies on this subject, but, if men dispute and object, shall leave the decision to Time and Trial.'—*Siris*, Sect. 68.

1. AMONG the great numbers who drink Tar-water in Dublin, your letter informs me, there are [2 some] that make or use it in an undue manner. To obviate [3 these] inconveniences, and render this water as generally useful as possible, you desire I would draw up some rules and remarks in a small compass, which accordingly I here send you.

[1] This *Letter* to Thomas Prior, the Irish patriot, and Berkeley's old friend, was first published in Dublin (reprinted at the same time in London, 'for M. Cooper, at the Globe in Paternoster Row'), in July 1744, about three months after the first appearance of *Siris*. Appended to it is *An Answer to a supposed Physician's Letter to the Right Reverend the Bishop of Cloyne, occasioned by his Treatise on the Virtues of Tar-water*. This *Answer* may have been written by Mr. Prior. The supposed physician's *Letter* was published anonymously in May 1744.

Berkeley's *Letter*, and the other tracts were contributions to what may be called 'the Tar-water Controversy' of 1744 and several years following,—a controversy occasioned by the sudden and extraordinary popularity of the proposed medicine, and by its supposed claim to be a Panacea or Catholicon. It was a medical and not a metaphysical controversy; the medicinal virtues of Tar-water being almost exclusively regarded, in this and the four following tracts, as well as in the pamphlets and letters on the subject which appeared then and afterwards. (See Editor's Preface to *Siris*).

A second edition of this *Letter* appeared along with the *Second Letter*, in May 1746, as an Appendix to Mr. Prior's *Authentic Account of the Effects of Tar-water*. The second motto (*Siris*, sect. 68) was added in the second edition. I have marked by brackets the changes introduced in this edition.

[2] 'several,'—in first edition.

[3] 'those,'—in first edition.

2. [[4] Pour a gallon of cold water on a quart of liquid tar; stir, mix, and work them thoroughly together, with a wooden ladle, or flat stick, for the space of five or six minutes. Then let the vessel stand close covered three days and nights, that the tar may have full time to subside. After which, having first carefully skimmed it without moving the vessel, pour off the clear water, and keep it in bottles, well corked for use. This method will produce a liquor stronger than that first published in *Siris*, but not offensive, if carefully skimmed.] It is a good general rule, but, as stomachs and constitutions are [[5]so] various, it may admit of some latitude. Less water or more stirring makes it stronger, as more water or less stirring makes it weaker. [[6]It is to be noted that if several gallons are made at once in the same vessel, you must add five or six minutes' stirring for every gallon. Thus two gallons of water and two quarts of tar require ten or twelve minutes' stirring.]

3. The same tar will not do so well a second time, but may serve for other common uses: the putting off tar that hath been used for fresh tar would be a bad fraud. To prevent which, it is to be noted that tar already used is of a lighter brown than other tar. The only tar that I have used is that from our northern Colonies in America, and that from Norway; the latter, being thinner, mixeth easier with water, and seems to have more spirit. If the former be made use of (as I have [[7]sometimes] known it with good success), the tar-water will require longer stirring to make it.

4. Tar-water, when right, is not paler than French, nor deeper colour than Spanish white wine, and full as clear; if there be not a spirit very sensibly perceived in drinking, you may conclude the tar-water is not good; if you would have it good, see it made yourself. Those who begin with it little and weak may by habit come to drink more and stronger. According to the season, or the humour of the patient, it may be drank either cold or warm; [[8]in colics, I take it to be best warm.

[4] In the first edition instead of the sentences within brackets we have—'Put a gallon of cold water to a quart of tar, stir and work them strongly together, for about four minutes. Let the vessel stand close covered for eight and forty hours, that the tar may subside. Then pour off the clear water, and keep it in bottles, well corked, for use.' Cf. *Siris*, sect. 1.

[5] Omitted in second edition.

[6] Not in first edition.

[7] Omitted in second edition.

[8] Not in first edition.

If it disgusts a patient warm, let him try it cold, and *vice versa*. If at first it create to some squeamish persons a little sickness at the stomach, or nauseating, it may be reduced both in quality and quantity. In general, small inconveniences are either removed, or borne with small trouble;] it lays under no restraint as to air, exercise, clothes, or diet, and may be taken at all times in the year.

5. As to the quantity in common chronical indispositions, one pint of tar-water a day may suffice, taken on an empty stomach, at two or four times, to wit, night and morning, and about two hours after dinner and breakfast; more may be taken by strong stomachs. Alteratives in general, taken in small doses, and often, mix best with the blood—how oft or how strong each stomach can bear, experience will shew. But those who labour under great and inveterate maladies must drink a greater quantity; at least one quart [[9] every twenty-four hours], taken at four, six, or eight glasses, as best suits the circumstances and case of the drinker. All of this class must have much patience, and perseverance in the use of this as well as of all other medicines, which, if sure and safe, must yet, from the nature of things, be slow in the cure of inveterate chronical disorders. In acute cases, fevers of all kinds, it must be drank in bed, warm, and in great quantity, the fever still enabling the patient to drink perhaps a pint every hour, which I have known to work surprising cures. [[10] But it works so quick, and gives such spirits, that the patients often think themselves cured before the fever hath quite left them. Such, therefore, should not be impatient to rise, or apply themselves too soon to business, or their usual diet.]

[6 [11]. To some, perhaps, it may seem, that a slow alterative in chronical cases cannot be depended on in fevers and acute distempers, which demand immediate relief. But I affirm that this same medicine, which is a slow alterative in chronical cases, I have found to be also a most immediate remedy, when copiously taken, in acute and inflammatory cases. It might indeed be thought rash to have tried it in the most threatening

[9] '*per diem*,'—in first edition.
[10] Not in first edition.
[11] This and next section not in first edition.

fevers and pleurisies without bleeding, which in the common practice would have been held necessary. But for this I can say, that I had patients who would not be bled, and this obliged me to make trials of tar-water without bleeding, which trials I never knew unsuccessful. The same tar-water I found a slow alterative, and a sudden febrifuge. If the reader is surprised, I own myself to be so too. But truth is truth, and from whatever hand it comes should be candidly received. If physicians think they have a right to treat of religious matters, I think I have an equal right to treat of medicine.

7. Authority I have no pretence to. But reason is the common birthright of all. My reasons I have given in *Siris*. My motives every one will interpret from his own breast. But he must own himself a very bad man, who in my case (that is, after long experience, and under full conviction of the virtues and innocence of tar-water) would not have done as much. All men are, I will not say allowed, but obliged, to promote the common benefit. And, for this end, what I could not in conscience conceal, that I do and shall publicly declare, maugre all the spleen and raillery of a world which cannot treat me worse than it hath done my betters.]

8. As the morning's draught is most difficult to nice stomachs, such may lessen, or even omit it at the beginning, or rather postpone it till after breakfast, and take a larger dose at night: the distance from meal-time need not be more than one hour, [[12] for common stomachs, when the liquor is well clarified and skimmed. The oil that floated on the top and was skimmed off should be carefully laid by, and kept for outward sores.] [[13] In the variety of cases and constitutions, it is not amiss that there should be different manners of preparing and taking tar-water. Trial will direct to the best.] Whether there be any difference between old tar and new tar, or which of all the various tars, produced from different trees, or in different parts of the world, is most medicinal, future trials must determine.

9. I have made a second sort of tar-water to be used externally —as a wash [[14] or lotion] for the itch, scabs, ulcers, [[14] evil,]

[12] In first edition—'when the stomach is strong, or the glasses small: the oil that swims on the top may either be drank with the rest of the liquor, or skimmed off, and kept for outward sores.'

[13] Not in first edition.

[14] Not in first edition—in which also sect. 9 is part of the preceding one.

leprosy, and all such foul cases, which I have tried with [[14] very good] success, and recommend it to the trial of others. For inveterate cases of that kind, tar-water should be drank, a quart every twenty-four hours, at [[14] four,] six, or eight glasses: and, [[15] after this hath been done at least for a fortnight, the lotion is to be] applied outwardly and warm, by bathing, fomenting, and steeping, and this several times in the twenty-four hours, to heal and dry up the sores, [[14] the drinking being still continued]. This water, for external use, is made in the following manner: Pour two quarts of boiling water on a quart of tar; stir and work it strongly with a flat stick or ladle, a full quarter of an hour: let it stand six hours, then pour it off, and keep it close covered for use. It may be made weaker or stronger as there is occasion.

[10 [16] From what I have observed of the lotion, I am inclined to think it may be worth while, in obstinate cutaneous ailments, leprosy, and weakness of limbs, to try a bath of tar-water; allowing a gallon of tar to every ten gallons of boiling-hot water; stirring the ingredients a full half hour; suffering the vessel to stand eight or ten hours, before the water is poured off; and using the bath a little more than milk warm. This experiment may be made in different proportions of tar and water. In Dublin many cases occur for trial which are not to be met with here in the country.]

11. My experiments have been made in various cases, and on many persons; and I make no doubt its virtues will soon be more fully discovered; as tar-water is now growing into general use, though not without that opposition which usually attends upon novelty.—The great objection I find made to this medicine is that it promises too much. What, say the objectors, do you pretend to a *panacea*, a thing strange, chimerical, and contrary to the opinion and experience of all mankind? Now, to speak out, and give this objection or question a plain and direct answer —I freely own that I suspect tar-water is a panacea. I may be mistaken, but it is worth trial: for the chance of so great and general benefit, I am willing to stand the ridicule of proposing

[14] Not in first edition—in which also this section is part of the preceding one.

[15] In first edition—'at the same time the wash.'

[16] Not in first edition.

it. And, as the old philosopher cried aloud from the house-tops to his fellow-citizens—Educate your children, so, I confess, if I had a situation high enough, and a voice loud enough, I would cry out to all the valetudinarians upon earth—Drink tar-water.

12. Having thus frankly owned the charge, I must explain to you, that by a panacea is not meant a medicine which cures all individuals (this consists not with mortality), but a medicine that cures or relieves all the different species of distempers [17]. And, if God hath given us so great a blessing, and made a medicine so cheap and plenty as tar to be withal so universal in its effects, to ease the miseries of human life, shall men be ridiculed or bantered out of its use, especially when they run no risk in the trial? [[18]For I can truly affirm, that I never knew any harm attend it, more than sometimes a little nausea, which, if the liquor be well cleared, skimmed, and bottled, need not, I think, be apprehended.]

13. It must be owned I have not had opportunities of trying it myself in all cases; neither will I undertake to demonstrate *a priori* that tar-water is a panacea. But yet methinks I am not quite destitute of probable reasons, which, joined to what facts I have observed, induced me to entertain such a suspicion [17].

14. I [[19]knew] tar was used to preserve cattle from contagion; and this may be supposed to have given rise to that practice of drinking tar-water for a preservative against the small-pox. But, as the tar-water used for that purpose was made by mixing equal quantities of tar and water, it proved a most offensive potion: besides, as a fresh glass of water was put in for each glass that was taken out, and this for many days on the same tar, it [[20]follows] that the water was not equally impregnated with the fine volatile spirit, though all alike strongly saturated with gross particles.

15. Having found this nauseous draught very useful against the small-pox to as many as could be prevailed on to take it, I began to consider the nature of tar. I reflected [21] that tar is a balsam

[17] The claim of tar-water to be a *panacea*, which Berkeley offers only as a suggestion, is what is chiefly discussed in the Tar-water controversy, and to which the most plausible objections are made.

[18] Not in first edition.

[19] 'Know' in first edition.

[20] 'Followed' in first edition.

[21] Cf. *Siris*, sect. 10—39, with this section.

flowing from the trunks of aged evergreens; that it resists putrefaction; that it hath the virtues of turpentine, which in medicine are known to be very great and manifold;—but I observed withal that turpentines or balsams are very offensive in the taking. I therefore considered distinctly the several constituent parts of balsams; which were those wherein the medicinal virtues resided, and, which were to be regarded rather as a viscous matrix to receive, arrest, and retain the more volatile and active particles; and, if these last could be so separated and disengaged from the grosser parts as to impregnate a clear and potable liquor, I concluded that such liquor must prove a medicine of great force and general use. I considered that nature was the best chemist and preparer of medicines, and that the fragrance and flavour of tar argued very active qualities and virtues.

16. I had, of a long time, entertained an opinion, agreeable to the sentiments of many ancient philosophers—*That Fire may be regarded as the Animal Spirit of this visible world*[22].' And it seemed to me that the attracting and secreting of this fire, in the various pores, tubes, and ducts of vegetables, did impart their specific virtues to each kind; that this same light or fire was the immediate instrumental or physical cause of sense and motion, and consequently of life and health to animals; that, on account of this solar light or fire, Phœbus was in the ancient mythology reputed the god of medicine. Which light, as it is leisurely introduced, and fixed in the viscid juice of old firs and pines, so the setting it free in part, that is, the changing its viscid for a volatile vehicle, which may mix with water, and convey it throughout the habit copiously and inoffensively, would be of infinite use in physic, extending to all cases whatsoever—inasmuch as all distempers are in effect a struggle between the *vis vitæ* and the peculiar miasma or *fomes morbi*; and nothing strengthens nature, or lends such aid and vigour to life, as a cordial which doth not heat.

17. The solar light, in great quantity during the space of many successive years, being attracted and detained in the juice of ancient evergreens, doth form and lodge itself in an oil so fine and volatile as shall mix well with water, and lightly pass the

[22] This 'opinion' is the groundwork of a large part of *Siris*. Cf. especially sect. 152—230.

primæ viæ, and penetrate every part and capillary of the organical system, when once exempt and freed from the grosser nauseous resin. It will not, therefore, seem unreasonable to whoever is acquainted with the medicinal virtues of turpentine in so many different distempers, for which it hath been celebrated both by ancient and modern physicians, and withal reflects on the nausea or clog that prevents their full operation and effect on the human body; it will not, I say, seem unreasonable to such a one to suppose that, if this same clog were removed, numberless cures might be wrought in a great variety of cases.

18. The *desideratum* was—how to separate the active particles from the heavy viscid substance which served to attract and retain them; and so to order matters that the vehicle of the spirit should not on the one hand be volatile enough to escape, nor on the other gross enough to offend. For the performing of this, I have found a most easy, simple, and effectual method, which furnisheth a potable inoffensive liquor, clear and fine as the best white wine, cordial and stomachic, to be kept bottled, as being endued with a very sensible spirit, though not fermented.

19. I tried many experiments as to the quantity of water, and the time of stirring and standing, in order to impregnate and clarify it, and after all, fixed on the forementioned receipt, as the most generally useful for making this salutiferous liquor well impregnated, and not offensive to common stomachs, and even drank with pleasure by many; in which the most medicinal and active particles, that is, the native salts [[23]spirit] and volatile oil [[24]of the balsam], being disentangled [[24]and separated] from [[25]its] gross oil and viscous resin [[24]do, combined together, form a fine balsamic and vegetable soap, which not only] can [[23]freely] pass the [[24]stomach and] *primæ viæ*, but also insinuate [[26]itself into the minutest capillaries,] and pervade the whole animal [[27]system]; and that in such full proportion and measure as suiteth every case and constitution.

20. The foregoing general considerations put me upon making

[23] Omitted in second edition.
[24] Not in first edition.
[25] 'the'—in first edition.
[26] In first edition—'themselves into the smallest ducts.'
[27] 'machine'—in first edition.

experiments in many various and unlike cases, which otherwise I should never have thought of doing, and the success answered my hopes. Philosophical principles led me to make safe trials, and on those trials is founded my opinion of the salutary virtues of tar-water; which virtues are recommended from, and depend on, experiments and matters of fact, and neither stand nor fall with any theories or speculative principles whatever. Howbeit, those theories, as I said, enlarged my views of this medicine, led me to a greater variety of trials, and thereby engendered and nourished my suspicion—that it is a panacea. I have been the more prolix in these particulars, hoping that, to as many as shall candidly weigh and consider them, the high opinion I conceive of this medicine will not seem altogether an effect of vain prepossession, or blind empiric rashness, but rather the result of free thought and inquiry, and grounded on my best reason, judgment, and experience. [[28]Much complaint is indeed made of the iniquity of the times: however, it is hoped they will not condemn one man's tar-water for another's pill or drop, any more than they would hang one man for another's having stolen a horse.]

21. Those who have only the good of mankind at heart will give this medicine fair play; if there be any who act from other motives, the public will look sharp and beware. To do justice to tar-water, as well as to those who drink it, regard must be had to the particular strength and case of the patients. Grievous or inveterate maladies must not be treated as common cases. I cured a horrible case, a gangrene in the blood, which had broke out in several sores, and threatened speedy death, by obliging the person to drink nothing but this liquor for several weeks, as much and as often as his stomach would bear. Common sense will direct a proportionable conduct in other cases. But this must be left to the conscience and discretion of the givers and takers.

22. After all that can be said, it is most certain that a panacea sounds odd, and conveys somewhat shocking to the ear and sense of most men, who are wont to rank the Universal Medicine with the philosopher's stone, and the squaring of the

[28] Not in first edition.

circle; whereof the chief if not sole reason I take to be, that it is thought to be incredible the same things should produce contrary effects, as it must do if it cures opposite distempers. And yet this is no more than every day's experience verifies. Milk, for instance, makes some costive and others laxative. This regards the possibility of a panacea in general; as for tar-water in particular, I do not say it is a panacea, I only suspect it to be so—time and trial will shew.

23. But I am most sincerely persuaded, from what I have already seen and tried, that tar-water may be drank with great safety and success, for the cure or relief of most if not all diseases—of ulcers, itch, scald-heads, leprosy, the foul disease, and all foul cases, scurvies of all kinds, disorders of the lungs, stomach, and bowels, [[29]in rheumatic,] gouty, and nephritic ailments, [[29]megrims, inveterate head-aches,] pleurisies, peripneumonies, erysipelas, [[29]small-pox,] and all kinds of fevers, [[29]colics,] hysteric and all nervous cases, dropsies, decays, and other maladies. [[29]Note that for agues it should be drank warm and often, in small glasses, both in and out of the fit, and continued for several days to prevent a relapse.] Nor is it of use only in the cure of sickness; it is also useful to preserve health, and guard against infection; and in some measure even against old age, as its gives lasting spirits, and invigorates the blood. I am even induced, by the nature and analogy of things, and its wonderful success in fevers of all kinds, to think that tar-water may be [[29]very] useful against the plague, both as a preservative and a cure.

24. But I doubt no medicine can withstand that execrable plague of distilled spirits, which do all, without exception, (the fire of the hot still imparting a caustic and coagulating quality to all distilled spirits[30], whatever the subject or ingredients may be), operate as a slow poison, preying on the vitals, and wasting the health and strength of body and soul; which pest of human kind is, I am told, gaining ground in this country, already too thin of inhabitants.

I am, &c.

[29] Not in first edition.

[30] Cf. *Siris*, sect. 107, 108; and *Second Letter*, sect. 9.

A SECOND LETTER

TO THOMAS PRIOR, ESQ.,

ON THE VIRTUES OF TAR-WATER[1].

1. Your attention to whatever promotes the public good of your country, or the common benefit of mankind, having engaged you in a particular inquiry concerning the virtues and effects of Tar-water, you are entitled to know what farther discoveries, observations, and reflections I have made on the subject.

2. Tar-water, in the several editions of *Siris*, hath been directed to be made by stirring three, four, five, or six minutes, a gallon of water and a quart of tar. But, although it seems best made, for general use, within those limits, yet the stomach of the patient is the best rule whereby to direct the strength of the water; with a little more stirring, six quarts of good tar-water may be made from one of tar; and with eight minutes' stirring, I have known a gallon of tar-water produced from second-hand tar, which proved a good remedy in a very bad fever, when better tar could not be had. For the use of travellers, a tar-water may be made very strong, for instance, with one quart of water, and a quart of tar, stirred together for the space of five minutes. A bottle of this may serve long on a road, a little being put to each glass of common water, more or less, as you would have it stronger or weaker. Near two years ago, a quart of about this strength was given to an old woman, to be taken at one draught by direction of a young lady, who had consulted one in my family, about the method of preparing and giving tar-water, which yet she happened to mistake. But even thus, it did service in the main, though it wrought

[1] First published in 1746, appended, along with the *First Letter*, to Mr. Prior's *Authentic Account of the Effects of Tar-water*, which appeared at Dublin in that year.

the patient violently all manner of ways: which shews that errors and excesses in tar-water are not so dangerous as in other medicines.

3. The best tar I take to be that which is most liquid, or first running from the billets of fir or pine which grew on the mountains: it hath a greater share of the antiscorbutic vegetable juices, which are contained not only in the leaves and tender tops, but in all parts of the wood: and these, together with the salts of wood-soap, being in the composition of tar superadded to turpentine, render tar-water a medicine, if I am not mistaken, much more extensive and efficacious than any that can be obtained from turpentine alone.

4. The virtues of the wood-juices shew themselves in spruce-beer, made of molasses, and the black spruce-fir in the northern parts of America; and the young shoots of our common spruce-fir have been put to malt liquor in my own family, and make a very wholesome drink.

5. Tar-water seldom fails to cure, or relieve, when rightly made of good tar, and duly taken. I say, of good tar, because the vile practice of adulterating tar, and of selling the dregs of tar, or used tar for fresh, is grown frequent, to the great wrong of those who take it. Whoever hath been used to good tar-water can readily discern the bad by its flat taste, void of that warm cordial quality found in the former; it may also be expedient, for knowing fresh tar, to observe whether a fat oily scum floats on the top of the water, which is found to be much less, if any at all, on the second making of tar-water. This scum was directed to be taken off, not from its being apt to do harm when drank, but to render the tar-water more palatable to nice stomachs. Great quantities of tar are produced in Germany, Italy, and other parts of the world. The different qualities or virtues of these it may be worth while to try, and I wish the trial were made principally by observing, which giveth most sense of a lively cordial spirit upon drinking the water.

6. This medicine of tar-water worketh various ways, by urine, by perspiration, as a sudorific, carminative, cardiac, astringent, detergent, restorative, alterative, and sometimes as a gentle purgative or emetic, according to the case or constitution of the patient, or to the quantity that is taken; and its operation should not be

disturbed. I knew two brothers ill of a fever about the same time; it wrought on the one by copious sweating, on the other altogether by urine; and I have known it to act at different times differently, even on the same person, and in the same disorder; one while as a diaphoretic, or sudorific, another as a diuretic. Its general character is diuretic, which shews that it cleanseth the urinary passages, preventing thereby both stone and gravel, against which it hath been found very useful, and much safer than mineral waters, by reason of its balsamic healing quality.

7. Tar-water doth recover and impart vital heat, but imparts no inflaming heat. I have seen a wonderful cure wrought on a child about eight years old, and past all hopes, by pouring several spoonsful of tar-water down his throat, as he lay quite subdued by a most violent fever, without any appearance of sense or motion, the nostrils drawn back, the eyes fixed, the complexion deadly wan. And yet tar-water, forced down by spoonsful, seemed to kindle up life anew; and this after sage-tea, saffron, milk-water, Venice treacle, &c. had been used without any success.

8. This is of itself a sufficient cordial, friendly and congenial to the vital heat and spirits of a man. If, therefore, strong liquors are in the accustomed quantity superadded, the blood being already, by tar-water, sufficiently warmed for vital heat, the strong liquors superadded will be apt to overheat it, which overheating is not to be imputed to the tar-water, since, taken alone, I could never observe it attended with that symptom.

9. And, though it may be no easy matter to persuade such as have long indulged themselves in the free use of strong fermented liquors and distilled spirits to forsake their pernicious habits, yet I am myself thoroughly persuaded that, in the weakness or fatigue of body, or in low spirits, tar-water alone doth far surpass all those vulgarly-esteemed cordials, which heat and intoxicate, and which coagulate the fluids, and, by their caustic force, dry up, stiffen, and destroy the fine vessels and fibres of the unhappy drinkers, obstructing the secretions, impairing the animal functions, producing various disorders, and bringing on the untimely symptoms of old age. Nothing doth so much obstruct the good effects of tar-water as the abuse of strong liquors. Where this is avoided, it seems no chronical malady can keep its ground or stand before tar-water, constantly and regularly taken, not even hereditary

distempers, as the most inveterate king's evil, nor even the most confirmed gout; provided it be drank a quart a day, at six or eight glasses, and at all seasons, both in and out of the fit, and that for a great length of time, the longer the better. It is to be noted that in fits of the gout, colic, or fever, it should be always drank warm. On other occasions, warm or cold, as the patient likes.

10. The inference I make is, that those who expect health from tar-water have less need of any other cordial, and would do well to sacrifice some part of their pleasure to their health. At the same time, I will venture to affirm that a fever produced either from hard drinking, or any other cause, is most effectually and speedily subdued, by abstaining from all other cordials, and plentifully drinking of tar-water: for it warms the cold, and cools the hot; simple water may cool, but this, at the same time that it cools, gives life and spirit. It is, in truth, a specific for all kinds of fevers; the same medicine, which is a leisurely alterative in chronical disorders, being taken in larger quantities, is a speedy cure in acute ones.

11. Those who, without knowledge or experience of tar-water, have been so active and earnest to discredit its virtues, have much to answer for, especially with regard to acute inflammatory distempers, in which it doth wonders. It is in those disorders, so fatal and frequent, that I have had most opportunities of observing its virtues; nor can the world ever know the just value of this medicine, but by trying it in the like cases.

12. When patients are given over, and all known methods fail, it is allowed to try new remedies. If tar-water was tried in such cases, I do verily believe, that many patients might thereby be rescued from the jaws of death: particularly, I would recommend the trial of it in the most malignant and desperate fevers or small-pox, attended with purple, livid, or black spots. It is my sincere opinion that warm tar-water, drank copiously, may often prove salutary, even in those deplorable cases.

13. My opinion is grounded on its singular virtues in correcting, sweetening, and invigorating the blood, and in curing cancers and gangrenes, or beginning mortifications, such as those spots do indicate. I have lately known it drunk with good success in a very painful and unpromising wound; and am persuaded that if it were drank plentifully, during the dressing of all sorts of

dangerous wounds, it might assuage the anguish, and forward the cure; as it abates feverish symptoms, and, by rendering the blood balsamic and disposing the parts to heal, prevents a gangrene.

14. Tar itself is an excellent medicine, being spread on a cloth, and applied warm to an ulcer or wound. I have known the same applied to a very large and painful tumour, caused by a sprain or bruise, speedily assuage the pain, and reduce the swelling. I may add that tar (mixed with honey to make it less offensive, and) taken inwardly, is an admirable balsam for the lungs; and a little of this, taken together with tar-water, hastens its effect in curing the most obstinate and wasting coughs; and an egg-shell full of tar, swallowed and washed down with a quart of tar-water, night and morning, hath been found very useful for the same disorder in horses.

15. Sitting over the vapour of the heated lotion, described in my former letter, is excellent in the case of piles or fistula; especially if fomenting with the same lotion be added, as also anointing with the oil scummed from the top of tar-water. Tar-water hath been snuffed up the nostrils, with good success, for a great heaviness of the head and drowsiness. It is a very useful wash for weak, dry, or itching eyes; an excellent preservative for the teeth and gums; also a good drink and gargle for a throat: I may add that I have known it succeed in cases where it has been tried without hopes of success, particularly in deafness. I have known life sustained many days together only by drinking of tar-water, without any other nourishment, and without any remarkable diminution of strength or spirits; it may therefore be of singular use, and save many lives in the distress of famine at sea, or in sieges, and in seasons of great scarcity. The virtue of tar-water, flowing like the Nile[2] from a secret and occult source, brancheth into innumerable channels, conveying health and relief, wherever it is applied; nor is it more easy and various in its use than copious in quantity. How great havoc, nevertheless, is made by the small-pox, raging like a plague in New England, and other parts of America, which yet abound with tar! And how many thousand sailors, in all parts of the world, are rotting by the scurvy with their remedy at hand!

[2] [The Nile was by the ancient Egyptians called *Siris*, which word also signifies, in Greek, a chain, though not so commonly used as *Sira*.]—Author.

16. Many in this town of Cloyne have, by the copious drinking of tar-water alone, been recovered of the most violent fevers, attended with the most threatening symptoms, and much heightened by relapses from mismanagement. It would be tedious to enumerate all the cases of this kind which have happened at Cloyne and in my own family; where many fevers, pleuritic as well as others, attended with violent stitches, difficulty of breathing, and spitting of blood, have been cured by tar-water: and this I can with truth affirm, that I never knew it regularly tried, in any inflammatory case, without success: but then it must be given in bed warm, and very copiously, with all due caution against cold, noise, and improper diet.

17. I have often observed, when a patient, on the first attack of a fever, hath betaken himself to his bed, and drank tar-water regularly and constantly, that he hath had such favourable symptoms, so good appetite, and so sound sleep, that the fever passed almost as nothing; nor was to be distinguished otherwise than by a quickness of pulse, a little feverish heat, and thirst. The more that patients in a fever drink, the better they find themselves; and their liking to tar-water grows with their want of it, by a certain instinct or dictate of nature; insomuch that I have known children in very high fevers, who, at other times, could hardly be prevailed on to drink a single glass, drink six or eight in an hour.

18. I can truly affirm that, for the cases within my own observation, inflammatory acute distempers cured by tar-water have been at least ten times the number of any other. These indeed oftenest occur, as causing the chief destruction and general ravage of mankind: who are consequently debarred from the principal use and benefit of this medicine, so long as they give ear to the suggestions of those who, without any experience thereof, would persuade them it is of a heating or inflaming nature; which suggestion, as I am convinced myself, by long and manifold experience, that it is absolutely false, so may all others also be sufficiently convinced of its falsehood, by the wonderful fact, attested by a solemn affidavit[3] of Captin Drape at Liverpool; whereby it appears that of 170 negroes seized at once by the

[3] See Captain Drape's 'affidavit,' in Prior's *Authentic Account of the Effects of Tar-water*, pp. 18—20.

small-pox on the coast of Guinea one only died, who refused to drink tar-water; and the remaining 169 all recovered, by drinking it, without any other medicine, notwithstanding the heat of the climate, and the incommodities of the vessel. A fact so well vouched must, with all unbiassed men, outweigh the positive assertions of those who have declared themselves adversaries of tar-water, on the score of its pretended heating or inflaming quality[1].

19. The skill and learning of those gentlemen, in their profession, I shall not dispute; but yet it seems strange that they should, without experience, pronounce at once concerning the virtues of tar-water, and ascribe to it pernicious qualities, which I, who have watched its workings and effects for years together, could never discover. These three last years I have taken it myself without one day's intermission; others in my family have taken it near the same time, and those of different ages and sexes; several in the neighbourhood have done as much, all without any injury, and much benefit.

20. It is to be noted, the skin and the belly are antagonists; that is, the more passeth by perspiration, the less will pass another way. Medicines, therefore, which cause the patient to perspire will be apt to make him costive. Therefore, when tar-water worketh much by perspiration, the body may chance to be bound. But such symptom, though it should be attended with a little more than ordinary warmth, need not be dreaded by the patient; it being only a sign that his cure is carried on by driving the peccant matter through the skin; which is one of the ways whereby tar-water worketh its effect. And, when this effect or cure is wrought, the body of itself returneth to its former natural state; and, if some have been bound in their bodies, I have known others affected in a contrary manner upon drinking tar-water, as it hath happened to operate either in the shape of a diaphoretic, or of a gentle opening medicine. I have even known a costive habit more than once removed by it, and that when the case was inveterate, and other methods had failed.

21. I mentioned the foregoing article, upon calling to mind, that two or three patients had, for a time, complained of a binding quality in tar-water. I likewise remember that one

[1] Cf. *Siris*, sect. 7.

in a high degree of the scurvy was discouraged from the use of tar-water, by its having caused an uneasy itching all over his body. But this was a good symptom, which shewed the peccant humours to be put in motion, and in a fair way of being discharged through the skin.

22. An humour or flatus put in motion, and dislodged from one part, often produceth new pains in some other part; and an efficacious medicine, as it produceth a change in the economy, may be attended with some uneasiness, which yet is not to be accounted a distemper, but only an effect or symptom of the cure.

23. The salts of tar-water have nothing of the fiery and corrosive nature of lixivial salts produced by the incineration of the subject; they not being fixed salts, made by the extreme force of fire, but volatile salts, such as pre-existed in the vegetable, and would have ascended in smoke, if not prevented by the sods or covering of the billet piles. This, though already hinted in *Siris*, and plain from the manner of making tar, I have thought fit to repeat and inculcate, because, if duly attended to, it may obviate suspicions about tar-water, proceeding only from an ignorance of its nature.

24. Every step that I advanced in discovering the virtues of tar-water, my own wonder and surprise increased, as much as theirs to whom I mentioned them. Nor could I, without great variety and evidence of facts, ever have been induced to suspect that all sorts of ailments whatsoever it might relieve or cure, which at first sight may seem incredible and unaccountable; but, on maturer thought, will perhaps appear to agree with, and follow from, the nature of things. For, it is to be noted that the general notion of a disease seemeth to consist in this—that what is taken in is not duly assimilated by the force of the animal economy; therefore it should seem whatever assists the *vis vitæ* may be of general use in all diseases, enabling nature either to assimilate or discharge all unsubdued humours and particles whatsoever. But the light or æther detained in the volatile oil which impregnates tar-water, being of the same nature with the animal spirit, is an accession of so much strength to the constitution, which it assists to assimilate or expel whatever is alien or noxious.

A LETTER[1]

TO THOMAS PRIOR, ESQ.,

CONCERNING

THE USEFULNESS OF TAR-WATER IN THE PLAGUE.

WHEREIN ALSO IT IS CONSIDERED,

WHETHER TAR-WATER, PREPARED WITH THE DISTILLED ACID OF TAR, SHOULD BE PREFERRED TO THAT MADE IN THE COMMON WAY, BY MIXING TAR WITH WATER, AND STIRRING THEM TOGETHER.

'They provoked Him to anger with their own inventions, and the Plague brake in upon them.'—Ps. cvi. 29.

You observe, in a late letter of yours, that I had formerly hinted Tar-water might be useful in the Plague; and desire to know the reasons whereon my opinion was grounded, and that I would communicate my thoughts at large on the subject. I am the more willing to satisfy you in this particular, as the plague now raging in Barbary hath in some measure alarmed the public, and I think it may not be amiss to contribute my mite of advice towards averting or lessening the present danger; and, as fear begets caution, to possess my countrymen with an apprehension of this, the greatest of all temporal calamities, sufficient to put them on their guard, and prepare them against the worst that can happen.

A learned physician of our own observes that the plague does not visit these Britannic islands oftener than once in thirty or forty years, and it is now above twice that time[2] since we felt the hand of the destroying angel.

[1] First published in Dublin and London ('Innys, Hatch, and Cooper, Paternoster Row, and Davis in Holborn') in 1747, in the same pamphlet with the *Letter* to Dr. Hales.

[2] In 1665—eighty-two years before this was written. The plague has not since visited these islands.

It is also the opinion of physicians that the infection cannot spread except there is a suitable disposition in the air to receive it; the signs of which are wet summers, leaves and fruits blasted, an unusual quantity of insects, epidemical distempers among the cattle, to which I presume may be added long easterly winds—all which signs seem to have discovered themselves pretty plainly in the course of this present year.

Beside these natural forerunners of a plague or pestilence in the air, it is worth observing that a prognostic may be also made from the moral and religious disposition of the inhabitants. Certainly that the *digitus Dei* (the τὸ θεῖον of Hippocrates) doth manifest itself in the plague was not only the opinion of mankind in general, but also in particular of the most eminent physicians throughout all ages down to our own. How far we of these islands have reason to expect this messenger of Divine vengeance will best appear if we take a view of the prevailing principles and practices of our times, which many think have long called aloud for punishment or amendment.

Analogy and probability prevail in medicine: these are the proper guides where experience hath not gone before. I knew that tar-water was useful to prevent catching the small-pox, and consequently that its nature was contrary to the taint or venom producing that distemper; and therefore I concluded that it might be usefully applied to cure the same, though I never heard nor knew that it had been applied to that purpose, and the success answered my hopes.

In like manner, having known the virtue of tar-water in preserving from epidemical infection, I conceive in general it may be useful for the cure of distempers caused by such infection. Besides, being very well assured that tar-water was sovereign in the cure of all sorts of fevers, I think it not unreasonable to infer that it may prove a successful medicine for the plague, although I have never known it used in that distemper, forasmuch as the plague with all its symptoms may be considered as a species of fever, and hath been actually considered as such both by Hippocrates and Sydenham, not to mention others.

Having observed surprising effects of tar-water in the most

deplorable cases, for instance, pleurisies, small-pox, spotted and erysipelatous fevers, I am induced to entertain great hopes of its success in pestilential fevers or plagues; which are also confirmed by its operating as a powerful diaphoretic and sudorific, when given warm and in great quantities. Add to this, that it frequently throws out pustules and ulcers, is apt to terminate the worst of fevers by an irruption of boils in various parts of the body; that it raises the spirits, is a great alexipharmacum and cordial, and must therefore be of the greatest use in malignant cases.

In cachexy, scurvy, gout, as well as in the close of fevers, I have often known tar-water cause troublesome eruptions or boils (the very method taken by nature in casting forth the venom of the plague) to break out in the surface of the body, expelling the morbific humours, the cause and relics of the disease, to the signal benefit of the patients; except such who, being frightened at the symptoms, have supposed the tar-water to produce those humours which it only drives out, and, in consequence of such their groundless suspicion, laid it aside, or perhaps took other medicines to hinder its effect, and thereby deprive themselves of the benefit they might otherwise have received.

In the plague are observed head-ache, drowsiness, anxiety, vigils, sinking of spirits, and weakness, for all which tar-water hath been found an effectual remedy. Bloody urine and spitting blood, which are also dangerous symptoms observed in the plague, have been often removed by the same medicine, which from numberless experiments I have found to be peculiarly fitted for purifying and strengthening the blood, and for giving it a due consistence, as well as a proper motion.

In the plague, pleurisies are esteemed mortal symptoms, and in the cure of these I never knew tar-water fail, if given warm in bed, a pint or more an hour, though the patient was neither bled nor blistered. The carbuncles and spots which shew themselves in the plague are of a gangrenous nature, tending to mortification. And gangrenes I have known effectually cured by copious drinking of tar-water.

An erysipelas, which sheweth a degree of malignity nearest to the plague, is easily cured by plentiful drinking of tar-water.

I knew a person who had been six weeks ill of an erysipelas under the care of a celebrated physician, during which time she struggled with many dangerous symptoms, and hardly escaped with life. This person was a year after seized again in the same manner, and recovered in a week, by the sole use of tar-water. Costiveness is reckoned a very hopeful prognostic in the plague; and it is also a symptom which often attends the drinking of tar-water, when it throws out the venom of a distemper through the skin.

Diseases of the same season generally bear some affinity to each other in their nature and their cure; and it may not be improper on this occasion to observe that the reigning distemper of the black cattle hath been often cured by tar-water, and would (I am persuaded) have done much less mischief, if the practice had been general to have given each distempered beast three gallons the first, two the second, and one the third day, in warm doses (from a pint to a quart), and at equal intervals.

Diemerbroeck[3] recommends in the first appearance of a plague the use of sudorifics, putting the patient to bed, and covering him warm, till a copious sweat be raised, the very method I constantly follow in the beginning of fevers, using no other medicine than tar-water; which, after numberless experiments, I take to be the best sudorific that is known, inasmuch as it throws out the morbific miasma, without either heating the patient or weakening him, the common effects of other sudorifics, whereas this, at the same time that it allays the feverish heat, proves a most salutary cordial, giving great and lasting spirits.

Upon the whole, I am sincerely persuaded that for the cure of the plague there cannot be a better method followed, more general for use, more easy in practice, and more sure in effect, than to cover the patient warm in bed, and to make him drink every hour one quart of warm tar-water, of such strength as his stomach is able to bear; a thing not so impracticable as it may seem at first sight, since I have known much more drank in fevers, even by children, and that eagerly and by choice, the distemper calling for drink, and the ease it gave encouraging to

[3] An eminent Dutch physician, who practised at Nimeguen during the great plague there, in 1635–7. His work *De Peste* appeared in 1646.

go on. This for the cure; but I conceive that one quart *per diem* may suffice for prevention; especially if there be added an even temper of mind, and an exact regimen, which are both highly useful against the plague. For carbuncles and buboes I would recommend a liniment of the oil of tar, or a plaster of pitch mixed with water, which last was used by the vulgar in the Dutch plague described by Diemerbroeck.

It has pleased divine Providence to visit us not long since, first with famine, then with the sword; and if it should please the same good Providence yet farther to visit us for our sins, with the third and greatest of human woes, this, by God's blessing, is the course I mean to take for myself and family; and if generally practised, it would, I doubt not (under God), save the lives of many thousands; whereof being persuaded in my own mind, both from the many trials I have made of tar-water, and the best judgment and reasonings I could form thereupon, I think myself obliged to declare to the world what I am convinced of myself.

And I am the rather moved to this by the great uncertainty and disagreement among physicians, in their methods of treating the plague. Diemerbroeck, for instance, a physician of great experience in the Dutch plague that raged about eighty years ago, dissuades by all means from bleeding in that distemper. On the other hand, Sydenham recommends what the other disapproves. If we believe Dr. Sydenham, the free use of wine, as a preservative, hath thrown many into the plague who otherwise might have escaped. Dr. Willis, on the contrary, avers that he knew many who, being well fortified by wine, freely entered amongst the infected without catching the infection.

Bleeding cools, but at the same time weakens nature. Wine gives spirits, but heats withal. They are both, therefore, to be suspected; whereas tar-water cools without weakening, and gives spirit without heating, a sure indication of its sovereign virtue in all inflammatory and malignant cases; which is confirmed by such numbers of instances that matter of fact keeps pace (at least) with reason and argument in recommending this medicine.

Plagues as well as fevers are observed to be of different kinds: and it is observed of fevers that, as they change their genius in different seasons, so they must be treated differently, that

very method that succeeded in one season often proving hurtful in another. Now it is very remarkable, that tar-water has been known to vary its working, and wonderfully adapt itself to the particular case of the patient, a thing I frequently have experienced.

Last spring two children, a boy and a girl, the former ten years old, the latter eight years old, were seized with fevers; the boy had an inflammation in his breast. In less than two hours they drank each above five quarts of warm tar-water, which wrought them very differently, the girl as an emetic, the boy as a gentle purge, but both alike immediately recovered, without the use of any other medicine: of this I was an eye-witness, and I have found by frequent experience that the best way is, to let this medicine take its own course, not hindered nor interrupted by any other medicines; and, this being observed, I never knew it to fail so much as once, in above a hundred trials in all sorts of fevers.

Nevertheless, there are not wanting those who would insinuate that tar-water made in the common way contains noxious oils or particles of tar, which render it dangerous to those who drink it, a thing contrary to all my experience. This was the old objection made by those who opposed it from the beginning. But I am convinced, by innumerable trials, that tar-water is so far from doing hurt by any caustic or fiery quality, that it is, on the contrary, a most potent medicine for the allaying of heat, and curing of all inflammatory distempers. The perpetually returning to the same objection makes it necessary to repeat the same answer.

And yet some who are not afraid to argue against experience would still persuade us that the common tar-water is a dangerous medicine, and that the acid freed from the volatile oil is much more safe and efficacious[4]: but I am of opinion that, being robbed of its fine volatile oil (which neither sinks to the bottom, nor floats at the top, but is throughout and intimately united with it, and appears to the eye only in the colour of tar-water); being robbed, I say, of this oil, it is my opinion it can be no cordial;

[4] He probably refers to the recommendation of the acid alone in *A Letter to the Rev. Dr. Hales, Concerning the Nature of Tar, and a method of obtaining its Medical Virtues free from its hurtful Oils*, by A. Reid, Esq. (1747.) Mr. Reid proposes to administer the acid entirely separated from the oil.

which opinion (not to mention the reason of the thing) I ground on my own experience, having observed that the most acid water is the least cordial, so far am I from imputing the whole virtue to the acid, as some seem to think.

It seems not very reasonable to suppose that the caustic quality of tar-water (if such there was) should be removed or lessened by distillation, or that a still should furnish a cooler and better medicine than that which is commonly prepared by the simple affusion and stirring of cold water. However the ends of chemists or distillers may be served thereby, yet it by no means seemeth calculated for the benefit of mankind in general to attempt to make people suspect, and frighten them from the use of a medicine, so easily and so readily made, and everywhere at hand, of such approved and known safety, and, at the same time, recommended by cures the most extraordinary, on persons of all sexes and ages, in such variety of distempers, and in so many distant parts of Christendom.

By most men, I believe, it will be judged, at best, a needless undertaking, instead of an easy-tried medicine to introduce one more operose and expensive, unsupported by experiments, and recommended by wrong suppositions—that all the virtue is in the acid; and that the tar-water, being impregnated with volatile oil, is caustic, which are both notorious mistakes.

Though it be the character of resin not to dissolve or mix with water as salts do, yet it attracts some fine particles of essential oil, which serves as a vehicle for such acid salts; and the colour of the tar-water sheweth the fine oil, in which the vegetable salts are lodged, to be dissolved and mixed therein. The combination of two such different substances as oil and salt constitutes a very subtle and active medicine, fitted to mix with all humours, and resolve all obstructions, and which may properly be called an acid soap.

Tar-water operates more gently and safely, as the acid salts are sheathed in oil, and, thereby losing their acrimony, approach the nature of neutral salts, and so become more friendly to the animal system. By the help of a smooth insinuating oil, these acid salts are more easily and safely introduced into the fine capillaries. I may add, that the crasis of the blood is perfected by tar-water, being good against too great a solution and fluidity as a balsam,

and against viscidity as a soap, all which entirely depends upon the mixture of oil with the acid, without which it could neither operate as a balsam nor a soap. Briefly, it was not mere acid or distilled water, or tincture of tar, but tar-water, as commonly made, by affusion and stirring of cold water upon tar, which hath wrought all those great cures and salutary effects, which have recommended it as a medicine to the general esteem of the world.

The mixture of volatile oil, which is or contains the spirit, is so far from noxious that it is the very thing that makes tar-water a cordial; this gives it a grateful warmth, and raiseth the spirits of the hysteric and hypochondriacal; this also, rendering the blood balsamic, disposeth wounds of all sorts to an easy cure; this also it is that fortifies the vitals, and invigorates nature, driving the gout to the extremities, and shortening the fits, till it entirely subdues that obstinate and cruel enemy, as it hath been often known to do; but acid alone is so far from being able to do this, that, on the contrary, the free use of acids is reckoned amongst the causes of the gout.

I never could find that the volatile oil drawn from tar by the affusion of cold water produced any inflammation, or was otherwise hurtful, not even though the water by longer stirring had imbibed far more of the oil than in the common manner, having been assured, that some of strong stomachs have drank it after twenty minutes' stirring, without any the least harm, and with very great benefit.

It hath been indeed insinuated that the oil was ordered to be skimmed off, because it is caustic and dangerous; but this is a mistake. I myself, among many others, drank the tar-water for two years together, with its oil upon it; which never proved hurtful, otherwise than, as being somewhat gross, and floating on the top, it rendered the water less palatable, for which reason alone it was ordered to be skimmed.

It hath also been hinted that making tar-water the second time of the same tar was cautioned against, for that it was apprehended such water would prove too heating; which is so far from being true that, when I could not get fresh tar, I used the second water without difficulty, by means whereof it pleased God to recover from the small-pox two children in my own family, who drank it very

copiously, a sufficient proof that it is not of that fiery caustic nature which some would persuade us.

The truth is, my sole reason for advising the tar not to be used a second time was, because I did not think it would sufficiently impregnate the water, or render it strong enough, after so much of the fine volatile parts had been carried off by the former infusion. Truth obligeth me to affirm that there is no danger (for as much as I could ever observe) to be apprehended from tar-water, as commonly made; the fine volatile oil, on which I take its cordial quality to depend, is, in its own nature, so soft and gentle, and so tempered by the acid, and both so blended and diluted with so great a quantity of water, as to make a compound, cherishing and cordial, producing a genial kindly warmth without any inflaming heat, a thing I have often said, and still find it necessary to inculcate.

Some medicines indeed are so violent that the least excess is dangerous; these require an exactness in the dose, where a small error may produce a great mischief. But tar is, in truth, no such dangerous medicine, not even in substance; as I have more than once known it taken innocently, mixed with honey, for a speedy cure of a cold.

But, notwithstanding all that hath been said on that subject, it is still sometimes asked, What precise quantity or degree of strength is required? To which I answer (agreeably to what hath been formerly and frequently observed), The palate, the stomach, the particular case and constitution of the patient, the very climate or season of the year, will dispose and require him to drink more or less in quantity, stronger or weaker in degree; precisely to measure its strength, by a scrupulous exactness, is by no means necessary. Every one may settle that matter for himself, with the same safety that malt is proportioned to water in making beer, and by the same rule, to wit, the palate.

Only in general thus much may be said, that the proportions I formerly recommended will be found agreeable to most stomachs, and withal of sufficient strength, as many thousands have found, and daily find, by experience.—I take this opportunity to observe, that I use tar-water made in stone ware or earthen very well glazed, earthen vessels unglazed being apt to communicate a nauseous sweetness to the water.

Tar-water is a diet-drink, in the making whereof there is great latitude, its perfection not consisting in a point, but varying with the constitution and palate of the patient, being, nevertheless, at times, taken by the same person, weaker or stronger, with much the same effect, provided it be proportionably in greater or lesser quantity. It may indeed be so very weak as to have little or no effect; and, on the other hand, so very strong as to offend the stomach; but its degree of strength is easily discerned by the colour, smell, and taste, which alone are the natural and proper guides whereby to judge thereof: which strength may be easily varied, in any proportion, by changing the quantity either of tar or water, or the time of stirring. As for setting tar-water to stand, this is not to make it stronger, but more clear and palatable.

I found myself obliged to assert the innocence and safety, as well as usefulness, of the tar-water, as it is commonly made by the methods laid down in my former writings on this subject; and this not only in regard to truth, but much more in charity to a multitude, which may otherwise perhaps be influenced by the authority of some who endeavour to put them out of conceit with a medicine so cheap, so efficacious, and so universal, by suggesting and propagating scruples about a caustic quality arising from the volatile oily particles of tar, or resin imbibed together with the acid in making tar-water; an apprehension so vain that the reverse thereof is true, for which I appeal to the experience of many thousands, who can answer for the innocence and safety, as well as efficacy, of this medicine, of which there are such ample and numerous certificates published to the world.

I shall finish my essay on the Plague and its Cure with observing that, in case God should withhold his hand for the present, yet these reflections will not be altogether fruitless, if they dispose men to a proper temper of mind, and a cautious regimen, avoiding all extremes (which things are justly reckoned among the chief preservatives against infection), but especially if the apprehension of this destroyer shall beget serious thoughts on the frailty of human life, and, in consequence thereof, a reformation of manners; advantages that would sufficiently repay the trouble of writing and reading this Letter, even though the trial of tar-water, as a remedy for the plague, should be postponed (as God grant it may) to some future and distant opportunity.

A LETTER

TO THE REVEREND DR. HALES

ON THE

BENEFIT OF TAR-WATER IN FEVERS,

FOR CATTLE AS WELL AS THE HUMAN SPECIES[1].

To one gallon of fresh tar, pour six gallons of cold water; stir and work them strongly together, with a large flat stick, for the space of one full hour; let the whole stand six or eight hours, that the tar may subside; then scum it, and pour off the water, whereof three gallons warm are to be given the first day, two the second, and one the third day, at equal intervals, the dose not being less than a pint, nor more than a quart; and the beast being all that time, and for two or three days after, kept warm and nourished, if it will not eat hay, with mash or gruel.

I believe this course will rarely fail of success, having often observed fevers in human kind to have been cured by a similar method. But, as in fevers it often throws out pustules or ulcers on the surface of the body, so in beasts it may be presumed to do the like; which ulcers, being anointed with a little tar, will, I doubt not, in a short time, dry up and disappear.

By this means the lives of infected cattle may be preserved at the expense of a gallon of tar for each. A thing which I repeat and inculcate, not only for the sake of the cattle and their owners,

[1] This *Letter* was first published in 1747, in the same pamphlet with the foregoing Letter to Mr. Prior, 'at his Lordship's desire, on occasion of the present distemper among the Cattle, and for the general good of mankind.' It is unaccountably omitted in all the Collected Editions of Berkeley. A protracted epidemic of Cattle-distemper was raging in these islands when this *Letter* was written.

Dr. Hales was author of *An Account of some Experiments and Observations on Tar-Water: wherein is shown the quantity of Tar that is therein* (read before the Royal Society), which appeared early in 1745, followed by a second edition in 1747. With Boyle, Newton, and Halley, he was a frequent contributor to the *Philosophical Transactions*. His work on *Vegetable Staticks* (1727) helped to lay the foundation of Vegetable Physiology. He died in 1761, at an advanced age. Cf. *Siris*, sect. 196.

but also for the benefit of mankind in general, with regard to a fever; which terrible subduer and destroyer of our species, I have constantly found to be itself easily subdued by tar-water. Nevertheless, though in most other cases I find that the use of this medicine hath generally obtained, yet in this most dangerous and frequent case, where its aid is most wanted, and at the same time most sure, I do not find that the use thereof has equally obtained abroad in the world.

It grieves me to think that so many thousands of our species should daily perish, by a distemper which may be easily cured by a remedy so ready at hand, so easy to take, and so cheap to purchase, as Tar-water, which I never knew to fail when copiously drank in any sort of fever. All this I say after more than a hundred trials, in my own family and neighbourhood.

But, whatever backwardness people may have to try experiments on themselves or their friends, yet it is hoped they may venture to try them on their Cattle, and that the success of such trials in fevers of brutes (for a fever it plainly is) may dispose them to probable hopes of the same success in their own species.

Experiments, I grant, ought to be made with caution, and yet they may be made, and actually are made every day on probable reasons and analogy. Thus, for instance, because I knew that tar-water was cordial and diaphoretic, and yet no inflamer, I ventured to give it in every stage of the small-pox, though I had never heard of its being given otherwise than as a preservative against that distemper; and the success answered my expectation.

If I can but introduce the general use of tar-water for this murrain, which is in truth a fever, I flatter myself this may pave the way for its general use in all fevers whatever.

A murrain among cattle hath been sometimes observed to be the forerunner of the Plague among men. If that should prove the present case (which God forbid) I would earnestly recommend the copious drinking of warm tar-water, from the very first appearance of the symptoms of such plague. I do also recommend it to be tried in like manner against the bite of a mad dog, when other approved remedies are not at hand.

FARTHER THOUGHTS

ON

TAR-WATER.

1752.

FARTHER THOUGHTS ON TAR-WATER[1].

As the many experiments that are daily made of the virtues of Tar-water furnish new discoveries and reflections, some of these I have thrown together, and offer to the public in hopes they may prove useful.

It is a frequent complaint that tar-water is made of bad tar, being of a reddish colour, sweetish, or disagreeably insipid. But, though the dregs of tar are often foul, and make foul tar-water, and though the tar already used is often made use of by unfair dealers a second, if not a third time, which produceth a vile potion, void of the genuine flavour and virtue of tar-water; yet I apprehend these defects may sometimes be ascribed rather to the vessel wherein the tar-water is made than to the tar itself.

Tar-water being made in an earthen vessel unglazed, or that hath lost part of its glazing, may extract (as it is a strong menstruum) from the clay a fade sweetishness, offensive to the palate. It should seem, therefore, that the best way of making tar-water is in a stone jug, or earthen vessel, throughout well glazed; and, as it will not fail to extract a tincture from any metallic vessel, it should be warmed in a well-glazed pipkin, rather than a sauce-pan.

By increasing the proportion of tar to the water, and by stirring it longer, tar-water may be made strong enough for a spoonful to impregnate a large glass, a thing very useful on a road.

Those who in chronical disorders, or as a preservative, have for a long time drank tar-water, must in acute cases drink the more.

Tar-water must be drank warm in agues, small-pox, measles, and fevers, in cholic, and disorders of the bowels, in gout also, and rheumatism; in most other ailments cold or warm, at the choice of the patient.

[1] Berkeley's literary life closes with this tract, which appeared in the *Miscellany*, in October 1752, about three months before his sudden death. It seems to have been written at Cloyne, in the early part of that year, as he removed to Oxford in July.

In fevers the patient cannot begin too soon, or drink too much. By undoubted experience it is found to cool the hot, and warm the cold, and to be a most successful medicine in fevers, notwithstanding its great virtue in palsies and dropsies.

When not long since an inflammation attacked the throat, breast, and lungs of children, and became general in my neighbourhood, numbers were recovered by the use of tar-water; nor did I hear that any miscarried who used it, though many perished who did not.

Nor is it a medicine less proper and efficacious in old age. At the same time that this inflammatory distemper raged among the children, a woman in her sixty-eighth year, from violent cold, was seized at once with ague, colic, and jaundice, of all which maladies she was cured in a fortnight, by drinking three pints of warm tar-water every day. Numberless such instances daily occur, which shew it to be a safe and efficacious medicine for old and young.

Evacuations by sweat, which usually render patients very weak and dispirited, have not the same bad effects when produced by tar-water, which I have frequently known to give high spirits in all the stages of a fever, and under the lowest regimen; therefore old people and weak persons, who cannot well bear common evacuations, are best cured by tar-water, which in some sort seemeth to renew those who are worn out with age and infirmities.

Tar-water is of singular use in strengthening the stomach and bowels, and agrees particularly well with infants, taken either by themselves or by the nurse, and best by both. Though, as it throws the ill humours out into the surface of the skin, it may render them for a time, perhaps, unseemly with eruptions, but withal healthy and lively. And I will venture to say that it lays in them the principles of good constitution for the rest of their lives.

Nor is it only useful to the bodies of infants; it hath also a good effect on their minds, as those who drink it are observed to be remarkably forward and sprightly. Even the most heavy, lumpish, and unpromising infants appear to be much improved by it. A child there is in my neighbourhood, of fine parts, who at first seemed stupid and an idiot, but, by constant use of tar-

water, grew lively and observing, and is now noted for understanding beyond others of the same age.

Infants are easily brought to take it by spoon, and even grow to a liking of it; and, as their disorders arise chiefly from indigestion, they receive the greatest benefit from a medicine so well calculated to strengthen the intestines, and preserve them from fits. In a word, if it were the common practice to accustom infants from the beginning to take tar-water, this would greatly conduce to the health both of their minds and bodies. There is, I am verily persuaded, no one thing in the power of art or nature that would so generally and effectually contribute to repair the constitutions of our gentry and nobility, by strengthening the children, and casting off in their infancy those impurities and taints which they often bring into the world.

An infant may take one quarter of a pint in the day, warm, by spoonfuls; less may do good, and there is no fear of excess. When I consider the private woe of families, as well as the public loss occasioned by the death of such an incredible number of infants under two years of age, I cannot but insist on recommending tar-water, both as a remedy and preservative in that tender age, which cannot bear the common treatment and methods of physic, or with safety take those drugs which are fitter for grown persons.

Another reason which recommends tar-water, particularly to infants and children, is the great security it brings against the small-pox to those that drink it, who are observed, either never to take that distemper, or to have it in the gentlest manner.

There is no distemper more contagious and destructive than the small-pox, or more generally dreaded, attended with worse symptoms, or that leaves behind it worse effects. I observe, at the same time, that tar-water is in no other case a more safe and sure remedy than in this; of which Captain Drape's certificate[2], sworn to before the Mayor of Liverpool, in the presence of several principal persons of that town, is a most evident proof.

That one hundred and seventy persons, seized at once with the

[2] Cf. *Second Letter to Thomas Prior, Esq.*, sect. 18. Berkeley is blamed by his critics for overlooking the negative instances which might be found by a more rigid inductive scrutiny of the effects of tar-water.

small-pox, deprived of all conveniences, and in the worst circumstances in a narrow ship and hot climate, should all recover by the single medicine of tar-water, except one who would not drink it, is a matter of fact so plain and convincing, and so well attested, as to leave no doubt, in minds free from prepossession, about the usefulness and efficacy of tar-water in the small-pox, a point I had been before sufficiently convinced of, by many instances in my own neighbourhood.

It hath been surmised by some celebrated physicians[3] that one day a specific may be discovered for the peculiar venom of the small-pox. There seems to be some reason for thinking that tar-water is such a specific. I say this on good grounds, having by many experiments observed its virtue in curing, as well as in preventing, that cruel distemper; during the whole course of which, it is to be drank warm; a moderate glass (about half a pint) every hour, in common cases, may suffice; in bad cases more may be given; there is no fear of excess.

Those who endeavour to discredit this cooling, cordial, and salutary medicine, as an inflamer of the blood, do very consistently decry its use in the small-pox; but there can be nothing more clear, full, and satisfactory than Captain Drape's affidavit, to convince reasonable people of the great and surprising efficacy of tar-water in the cure of the small-pox; and consequently of the groundlessness of that report which ascribes a heating or inflaming quality to it. And yet that groundless report hath hindered many from reaping the benefit they might otherwise have done from the use of this water, which is of excellent virtue in all kinds of inflammatory disorders, fevers, quinsies, pleurisies, and suchlike, of the hot and inflamed kind, whereof the public as well as myself have known a multitude of examples.

I ask whether the fact sworn before the magistrates of Liverpool be not a sufficient answer to all that is objected, from an inflaming quality, to tar-water? Can any instance be produced in the whole materia medica, or history of physic, of the virtue of a medicine tried on greater numbers, or under greater disadvantages, or with greater success, or more credibly attested? I wish, for

[3] Boerhaave, for instance. Cf. *Siris*, sect. 83. Berkeley was writing nearly half a century before the promulgation of Jenner's great discovery, which has conferred benefits upon the human race only second to those prognosticated from tar-water.

the common good of mankind, that the same experiment was tried in our hospitals. Probably the world would soon be relieved from that great and general terror of the small-pox.

When I hear of the devastations made by this distemper in great cities and populous towns, how many lives are lost, or as may be said thrown away, which might have been in all likelihood easily preserved, by the use of a medicine so cheap and obvious, and in every one's power, it seems matter of great concern and astonishment, and leaves one at a loss to guess at the motives that govern human actions in affairs of the greatest moment. The experiment may be easily made if an equal number of poor patients in the small-pox were put into two hospitals at the same time of the year, and provided with the same necessaries of diet and lodging; and, for farther care, let the one have a tub of tar-water and an old woman; the other hospital, what attendance and drugs you please.

In all obstinate sores and ulcers, I very much recommend the drinking of tar-water; and washing them with a strong lotion of it will hasten the cure.

One of the most painful and dangerous cases is that of a woman's sore breast. How many poor creatures, after long languishing in misery, are obliged to suffer the most severe chirurgical operations, often the cutting off the entire breast? The use of tar-water in those cases hath been attended with such success that I do earnestly recommend the drinking thereof, both as a cure and preservative, as a most effectual medicine to remove the shooting pains that precede a cancer, and also to cure the cancer itself, without amputation. Cancerous and sore breasts are such cruel cases, occasioned by so many internal causes, as well as outward accidents, that it is a necessary piece of humanity, to contribute all we can to the prevention and cure thereof.

In the king's evil, leprosy, and foulest cases, tar-water cannot be too much recommended. The poor vagabonds of Ireland are many of them infected and eaten up with the foul disease, which with them passeth for a canker as they call it. Several instances of extraordinary cures have been performed on such persons, by drinking tar-water copiously, for some weeks or months together, without confinement or other restraint than that of a regular cool

diet. It is indeed a specific both for this and all other taints and impurities of the blood.

An extract of *Siris* was made, and accounts of the effects of tar-water were reprinted in America [4], in which continent, as well as in the islands, much use hath been made thereof, particularly by those who possess great numbers of slaves. Of this I have been informed by letters, and by word of mouth, from persons belonging to those parts, who have assured me of the extensive and successful use of this medicine in many cases, and more especially in the most inveterate kinds of the foul disease.

I need not say how dearly they purchase health who obtain it by salivation, and yet, long and severe as that course is, it is often unsuccessful. There are instances of such as having passed through it with much misery and patience have been afterwards cured by the simple use of tar-water.

The king's evil, so loathsome in its symptoms and effects, and withal so difficult if at all possible to cure by any other method, is most surely and easily cured by the tar-water, even when the patient is far gone, even when he derives it from his ancestors. A quart *per diem* for a few months, I have known to cure the most deplorable and abandoned cases.

How many wealthy families, otherwise at their ease, are corrupted with this taint in their blood! How many want heirs and husbands through this odious malady! A specific for this disease alone would be justly esteemed a most valuable secret, and the plenty and cheapness of the medicine ought not in reason to make it less esteemed.

Salivating, bleeding, and purging are attended with great hardships and inconveniences even where the patient recovers, reducing the strength and spirits of those who use them, whereas tar-water greatly adds to both.

In fractures and wounds, a quart or two drank daily while the patient is under cure doth very much assuage the pain and

[4] In a letter to his American friend, Dr. Samuel Johnson, dated 'Cloyne, August 23, 1749,' Berkeley refers to 'a small pamphlet relating to tar-water' which Johnson had sent to him. He adds, 'I can only say, in behalf of those points in which the ingenious author seems to differ from me, that I advance nothing which is not grounded on experience, as may be seen at large in Mr. Prior's *Narrative of the Effects of Tar-water*, printed three or four years ago, and which may be supposed to have reached America.' He refers to this American pamphlet also in a letter to Mr. Archdall, in November 1751.

promote his recovery, both as by its balsamic nature it disposeth the parts to heal, and also as it lessens, if not totally prevents, the fever.

A poor boy in Cloyne, having fallen from a tree, broke both arm and wrist. This accident was concealed or neglected for two or three weeks; he was then put under the care of a skilful bone-setter, who, finding the bones knit and grown crooked, and that it would be necessary to break them again, in order to set them right, and withal considering the hot season of the year (in July), he apprehended his patient's being thrown into a fever that might prove fatal. But the boy being made to drink copiously of tar-water, this prevented or lessened the fever in such sort that the bones were broke and set again, and the cure proceeded as easily and speedily as could be wished.

I have known several instances of bruises and wounds cured by tar-water. A person in my neighbourhood ran over by a horse was much bruised, and cured only by drinking tar-water. Another knocked down with a mallet, thereupon thrown into a violent fever and given for dead; another wounded with an axe so that his life was thought in danger, were both recovered by the use of tar-water; which, as it is sovereign against gangrenes and fevers, hath great success in all sorts of wounds, contusions, and fractures, being taken throughout the whole chirurgical process, along with whatsoever other methods or remedies are applied.

Tar-water operates variously. In dropsies and bruises it hath been known to work by purging. The stronger kind being used as a wash is good against ulcerous eruptions. But, in all cases where the lotion is used, I believe the drinking of tar-water might alone suffice, albeit the sores may be longer withering and dying away.

There is a certain age or time of life when the female sex runs no small risk from the ceasing of their natural evacuations. In this case tar-water is a good preservative, purifying the blood, and clearing it from that cancerous tendency, which it is sometimes subject to about that time. I take it to be a specific in all cancerous cases, even the bleeding cancer, esteemed incurable by physicians, hath been cured by tar-water.

In diseases peculiar to women it is of no small use. Several who had suffered much by accidents in child-bearing have found

themselves relieved by tar-water. In all sorts of tumours, wens, and preternatural excrescences, it hath been found an excellent remedy.

Many dangerous symptoms, and even sudden death, are often owing to a polypus, in some or other of the vessels through which the blood circulates, than which it seems there is no inward cause of death or disease more to be dreaded and guarded against. How many drop down dead in our streets, or at table, or in the midst of business, or diversions? How many are found dead in their beds?

Tremors, palpitations of the heart, irregular pulses, apoplexies, sudden deaths, often proceed from a slow, stagnating, interrupted motion, or stoppage of the blood in its circulation through the body; and there seemeth to be no cause so certainly productive of obstructed circulation as the polypus, a case, perhaps, much more frequent than is commonly imagined. Morgagni [5], the celebrated professor at Padua, and most eminent anatomist, who was supposed to have dissected more human bodies than any man living, assured me, above thirty years ago, that in the far greater part of such bodies, he found polypuses, if not in the ventricles of the heart or larger vessels, yet in some other vessel or cavity; to which he attributes many disorders, and which he supposed to be formed by the obstructed motion of the blood. To prevent this, he dissuaded from all tight ligatures, especially in sleep, unbuttoning the neck and wristbands of his shirt every night, a practice he had learned (as he said) from his master the famous Malpighi [6].

When the circulation is once quite stopped nothing can restore it, which would be the same thing as restoring a dead man to life; and in proportion as the circulation of the blood is obstructed, the body is disordered. Total obstruction is death; partial obstruction is disease. The polypus therefore is always hurtful, if not mortal. It is, indeed, matter of serious reflection, that we may probably carry about with us a principle of death, always at work within,

[5] An Italian anatomist of high repute, for many years Professor of Anatomy at Padua, who died in 1771, in his ninetieth year. Berkeley seems to have met him in the course of his last visit to Italy, more than thirty years before this tract was written.

[6] One of the most famous anatomists and botanists of the seventeenth century, Professor of Medicine successively in the universities of Pisa, Messina, and Bologna. He died at Rome in 1694.

and of a nature so violent and sudden in its effects, so hard to come at, and so difficult to subdue.

It may well be thought, at first view, a vain undertaking, to attempt to dissolve a fleshy or membranous substance, so latent and inaccessible, by common means or medicines. But, as tar-water hath been undoubtedly known to dissolve and disperse wens, and other fleshy or membranous tumours, in the outward parts of the body[7], having been drank and circulated with the blood, it should seem, by a parity of reason, that it may also dissolve and put an end to those concretions that are formed in the ventricles of the heart or blood vessels, and so remove one great cause of apoplexies and sudden death: and what cures may prevent. I have been the longer on this subject, for the sake of many who lead sickly lives, as well as several who are snatched away by untimely death.

Universally, in all cases where other methods fail, I could wish this of tar-water was tried. It hath been sometimes known that the most inveterate head-aches, and other nervous disorders, that would yield to no other medicine, have been cured by a course of tar-water regularly and constantly pursued.

Wheresoever pure blood or plenty of spirits are wanting, it may be concluded from manifold experience that tar-water is of singular benefit. Several persons have acknowledged themselves to be much fitter to go through business or study from the use of it.

Nor is it only medicinal to human kind: it is also of no small use in the curing of brute animals. It hath been tried on several kinds, particularly with great success in the late epidemical distemper of our horses. And I have been credibly informed that, being drank in plenty, it hath recovered even a glandered horse that was thought incurable.

And, as it is of such extensive use both to man and beast, it should seem that a tub of tar-water constantly supplied in a market town, would serve, in some sort, for an hospital. Many other drugs are not easily got, this is everywhere plenty and cheap; many are of a doubtful nature, this of known innocence; others soon perish, this lasts for years, and it is not the worse for keeping. This, in short, is a medicine for the common people,

[7] [See *The Effects of Tar-water*, sect. 228, 229.]—Author. Prior's work is here referred to.

being a safe and cheap remedy for such as cannot afford to be long sick, or to make use of costly medicines.

A patient who drinks tar-water must not be alarmed at pustules or eruptions in the skin; these are good symptoms, and shew the impurities of the blood to be cast out. It is also not amiss to observe that, as tar-water, by its active qualities, doth stir the humours, entering the minutest capillaries, and dislodging obstructions, it may happen that this working shall sometimes be felt in the limbs, or discharge itself in a fit of the gout, which, however disagreeable, proves salutary.

I am credibly informed of several strange conveyances, which tar-water hath found out, whereby to discharge impurities from the human constitution. A person who had been in a bad state of health above twenty years, upon a course of tar-water was thrown into a most extraordinary fit of an ague, and from that time recovered a good state of health. An old gentleman in the county of Cork, who, for a long time, had been a valetudinarian, afflicted with many infirmities, being advised to drink tar-water, found himself relieved; but it produced and soon cured a pthiriasis or lousy distemper, in which the putrid humours having discharged themselves left him quite sound and healthy.

In a course of tar-water, if any disorder happens from some other cause, as from cold, from the use of strong liquors, from a surfeit, or suchlike accident, it would not be fair to impute it to tar-water: and yet this hath been sometimes done.

The effects of vomiting occasioned by tar-water are not to be apprehended. Some are discouraged from drinking because their stomachs cannot bear it. But, when it takes a turn towards working upwards, nature, by that very way, hath been often known to carry on the cure. A worthy gentleman, member of Parliament, came into my neighbourhood in the autumn of the year 1750: he was cachetic and extremely reduced, so that his friends thought him near his end. Upon his entering into a course of tar-water, it produced a prodigious vomiting, which weakened him much for the present; but, persisting to continue the use thereof for about two months, he was restored to his health, strength, and spirits.

Tar-water is very diuretic, thereby preventing stone and gravel, and carrying off by urine those salts that might otherwise occasion

fevers, rheumatisms, dropsies, headaches, and many other disorders, if retained in the blood. Hence some have apprehended a diabetes, from the continued use thereof, but it is so far from causing a diabetes that it hath been known to cure that disorder.

The constitution of a patient sometimes requireth, during a course of tar-water, that he take water and honey, also roasted apples, stewed prunes, and other diet of an opening kind. A hint of this is sufficient. If the reader now and then meets with some remarks contained in my former writings on this subject, he may be pleased to consider I had rather repeat than forget what I think useful to be known.

Some, endeavouring to discourage the use of tar-water in England, have given out that it may indeed be serviceable in Ireland, where people live on such low diet as sour milk and potatoes, but it cannot be of the same service in England, where men are accustomed to a more liberal and hearty food; and indeed it must be owned that the peasants in this island live but poorly, but no people in Europe live better (in the sense of eating and drinking) than our gentry and citizens; and from these the instances of cures by tar-water have been chiefly taken. Those who would confine its use to the moist air and poor diet of Ireland may be assured that all over Europe, in France, and Germany, Italy, Portugal, and Holland, tar-water works the same effects. In both North and South, in West and East Indies, it hath been used and continues to be used with great success. It hath reached all our Colonies both on the Continent and the Islands, and many barrels of tar-water have been sent from Amsterdam to Batavia; of all which I have had authentic accounts. But its use is nowhere more conspicuous than at sea, in curing that plague of seafaring persons, the scurvy, as was found in the late attempt to discover a north-west passage; and (as I doubt not) will be found as oft as it is tried. Every ship in his Majesty's navy should always have a vessel of tar-water upon deck, for the use of the sailors, both in the scurvy and other maladies.

It is indeed a medicine equally calculated for all climates, for sea and land, for rich and poor, high and low livers; being, as hath been elsewhere mentioned, a cordial which doth not heat; a peculiar privilege this, and of excellent use. That it is a cordial is manifest from its cheering and enlivening quality; and that

it is not heating is as manifest, from its singular use in all cases where the blood is inflamed. As this medicine imparts a friendly genial warmth, suited to the human constitution, those who pass through a course of tar-water would do well not to increase such friendly warmth to an inflaming heat, by a wrong regimen of high-seasoned food and strong liquors, which are not wanted by the drinkers of tar-water. There is a certain degree of heat necessary to the wellbeing and life of man. More than this will be uneasy, and this uneasiness indicates a proper choice of diet.

I have myself drank above a gallon of tar-water in a few hours, and been cooled and recovered from a fever by it. So many instances of the same nature I have known as would make it evident, to any unprejudiced person, that tar-water is a cooling medicine; of which truth I am as thoroughly convinced as it is possible to be of any theorem in physic or natural science.

The unsuccessfulness of other methods should rather be an encouragement than a bar to the trial of tar-water. A young lady, daughter to a worthy gentleman near Cork, had been long afflicted with a grievous pain in her side, and, having had the best advice that could be got, was not relieved until she drank tar-water, which quite removed her pain. Some time after she was again seized with the same disorder, but, returning to the use of tar-water, she grew well, and still continues so.

A woman turned out of the infirmary at Cork as incurable, because she would not submit to the cutting off her leg, came to Cloyne, where she continued half a year drinking tar-water, and living upon bread and milk, by which course she recovered and went to service.

There is at present, while I am writing, a most remarkable case here at Cloyne, of a poor soldier in a dropsy, whose belly was swollen to a most immoderate size. He said he had been five months in an hospital at Dublin, and, having tried other methods in vain, left it, to avoid being tapped. It is a fortnight since he came to Cloyne, during which time he hath drank two quarts of tar-water every day. His belly is now quite reduced: his appetite and sleep which were gone are restored: he gathers strength every moment: and he who was despaired of seems to be quite out of danger, both to himself, and to all who see him. It is remarkable that, upon drinking the tar-water, he voided

several worms of a very extraordinary size. This medicine, which is observed to make some persons costive, is to hydropic patients a strong purge. The present is but one of several instances wherein the dropsy hath been cured by tar-water; which I never knew to fail in any species of that malady.

I am very credibly informed that an aged clergyman of Maidstone in Kent, being reduced to the last extremity by the gout in his stomach, after having tried strong liquors and the methods usual in that case without success, betook himself to drink a vast quantity of warm tar-water, still replenishing and letting it take its course; by which it pleased God to deliver him from the jaws of death.

A gentleman in the county of Clare, near Ennis, had a fever and pleurisy, and inflammation of the lungs; being at the last extremity, and given over by two physicians, he was advised to drink tar-water, which he did, eight quarts. Next morning one of the doctors asking at what hour his patient died? to his great surprise found he was recovered. This I had from a parliament man, his neighbour.

When the yellow fever (as it was called) raged in the West Indies, the negroes, with a tub of tar-water in their quarters, did well: but some of the better sort miscarried, among whom the physician himself lay at the point of death; his brother recovered him by pouring down his throat in spoonfuls some of the same liquor that recovered the negroes. The fact was related to me by a gentleman who was then in the island of St. Christopher's, and knew it to be true.

A physician himself not long since assured me he had cured an ulcer in the bladder, by ordering his patient to drink tar-water, when he had tried all other methods in vain, and thought the case incurable.

But it would be endless to relate the effects of tar-water in desperate cases. The recovery of Mrs. Wilson, daughter of the late Bishop of London, from a lingering hopeless disorder, was a noted case, and attested to by his Lordship. I have even been informed, upon good authority, of two or three instances wherein persons have been recovered by tar-water after they had rattles in the throat.

In certain cases, a smaller quantity of tar-water hath proved

ineffectual, when a larger hath perfected the cure. A woman of Cloyne got cold after child bearing, which occasioned a great pain in her thigh, swelling also and redness; she continued in great torment above three weeks. She then began to drink tar-water, but not drinking much she did not perceive much good; and when there was not any hopes of her life, she was persuaded to try what a gallon a day might do; upon this she grew better, the swelling broke and ran; no dressing was used but tar, and no washing but tar-water, until she was quite recovered.

In ailments of an odd and untried nature, it may be worth while to try tar-water. In proof of this many instances might be given. A gentleman with a withered arm had it restored by drinking tar-water. Another who, by running his head against a post, had a concussion of the brain attended with very bad symptoms, recovered by drinking tar-water after other medicines had failed. In my own neighbourhood, one had lost the use of his limbs by poison, another had been bitten by a mad ass; these persons drank tar-water, and their cure was attributed to it.

When tar-water is copiously drank in fevers, the great danger to be guarded against is an excessive flow of spirits, which excites the patient to talk and divert himself with company, which may produce a relapse; of this I have known fatal effects.

If in a course of tar-water the patient should find himself heated, let him abstain from or lessen his dose of spirituous and fermented liquors; for tar-water alone never heats.

In chronical disorders it is not advisable to break off a course of tar-water at once, but rather to diminish the quantity by degrees.

The acid alone hath not the medicinal virtues of tar-water. This is agreeable to reason and experience, as well as the opinion of the ablest judges. Doctor Linden[8] justly observes, 'that when the empyreumatic oil is entirely separated from the acid, it is not in any shape superior to any other distilled acids or vinegars whatsoever.'—*Treatise on Selter Water*, p. 307.

[8] Diederick Wessel Linden, M.D., a German physician, settled in England, an authority in his day on mineral waters. The work here referred to, which appeared in 1752, is entitled *A Treatise on the Origin, Nature, and Virtues of Chalybeat Waters and Natural Hot Baths. To which is added an Appendix on the Selter Water.* In his Appendix the author refers with great approbation to the medical properties of tar-water, which he proposes to mix with Selter water in certain cases. Linden condemns Mr. Reid for recommending that the acid should be separated from the oil.

[9]That extraordinary virtues should be contained in tar-water will not seem strange, if we consider that pitch is nothing else but hardened tar, or tar drained of its moisture; and that an extraordinary quantity of light is retained in the substance of pitch, as appears from certain electrical experiments, which, having been made since, seem not a little to confirm what had before been suggested in *Siris*.

[9] [Something of this nature hath been long expected and hoped for, if we may credit that learned chemist Doctor Linden. 'At last (saith he) the long delayed wishes of the most eminent men of the faculty are fulfilled in the Bishop of Cloyne's discovery.' See *Treatise on Selter Water*, p. 303. Again (speaking of empyreumatic oils of plants) he hath these words—'There has always prevailed a notion among the chemists, and particularly with Paracelsus and his followers, that in those oils there lay a great secret undiscovered. This notion was occasioned by the strange effects which a small quantity thereof hath upon the human machine. Several have been very diligent to discover this secret, and to find out a method to administer these oils with safety. Yet nothing was performed salutary on this inquiry, until the Bishop of Cloyne discovered to us the tar-water; to him alone we are indebted for rendering the empyreumatic oils a safe medicine in every respect.' *Ibid.* p. 302.]—Author.

APPENDIX.

APPENDIX.

A.

THE FIRST EDITION OF THE 'QUERIST.'

[As already mentioned, the First Edition of the *Querist* appeared at Dublin in three successive Parts, in 1735 and the two following years[1]. This has long been out of print, and, like all previous editors of the *Querist*, I sought for it in vain, and was unable to find a copy before the sheets in this edition had passed through the press. Since then, however, I have been so fortunate as to find the Three Parts in the curious collection of pamphlets in the Royal Irish Academy. Through the kindness of Mr. Macsweeny, I am now able to present in this Appendix the numerous Queries (numbered as in the original) which were omitted in all the later editions of the *Querist*.

The original edition contains 894 Queries, in the Three Parts, while all the later ones have only 595.

The following Queries, contained in the later editions, are not found in the first edition:—Qu. 164, 165, 177–79, 191, 194–98, 202, 216, 233–35, 237, 265–68, 279, 335–44.

The following appeared some years since in a Bristol Catalogue of books for sale:—'Autograph MS. The Common-place Book of the Great Bishop Berkeley, in a thick volume folio, nearly 400 pages, vellum covers. Written throughout in a column one-half the width of the page, the blank remainder, in many parts, being occupied by later remarks, also in his handwriting. One part is occupied by 323 Queries —the original collection for *The Querist: containing several Queries proposed to the consideration of the Public. Part III.*' It is to be regretted that soon after the announcement was made this MS. was accidentally destroyed by fire, along with many other books mentioned in the Catalogue.

A. C. F.]

[1] See 'Advertisement by the Author,' and editor's prefatory note to the *Querist*, p. 353 of this volume; also p. 249 of the *Life and Letters* of Berkeley.

THE QUERIST.

FIRST PART. [PUBLISHED IN 1735.]

29. Whether, nevertheless, the damage would be very considerable, if by degrees our money were brought back to the English value there to rest for ever?

30. Whether the English crown did not formerly pass with us for six shillings? And what inconvenience ensued to the public upon its reduction to the present value, and whether what hath been may not be?

52. Whether it be not a bull to call that making an interest, whereby a man spendeth much and gaineth nothing?

55. Whether cunning be not one thing and good sense another? and whether a cunning tradesman doth not stand in his own light?

62. Whether, consequently, the fine gentlemen, whose employment is only to dress, drink, and play, be not a public nuisance?

77. Whether those specimens of our own manufacture, hung up in a certain public place, do not sufficiently declare such our ignorance? and whether for the honour of the nation they ought not to be removed?

201. Whether any nation ever was in greater want of such an expedient than Ireland?

209. Whether the public may not as well save the interest which it now pays?

210. What would happen if two of our banks should break at once? And whether it be wise to neglect providing against an event which experience hath shewn us not to be impossible?

211. Whether such an accident would not particularly affect the bankers? And therefore whether a national bank would not be a security even to private bankers?

212. Whether we may not easily avoid the inconveniences attending the paper-money of New England, which were incurred by their issuing too great a quantity of notes, by their having no silver in bank to exchange for notes, by their not insisting upon

repayment of the loans at the time prefixed, and especially by their want of manufactures to answer their imports from Europe?

213. Whether a combination of bankers might not do wonders, and whether bankers know their own strength?

214. Whether a bank in private hands might not even overturn a government? and whether this was not the case of the Bank of St. George in Genoa?

215. Whether we may not easily prevent the ill effects of such a bank as Mr. Law proposed for Scotland, which was faulty in not limiting the quantum of bills, and permitting all persons to take out what bills they pleased, upon the mortgage of lands, whence by a glut of paper, the prices of things must rise? Whence also the fortunes of men must increase in denomination, though not in value; whence pride, idleness, and beggary?

216. Whether such banks as those of England and Scotland might not be attended with great inconveniences, as lodging too much power in the hands of private men, and giving handle for monopolies, stock-jobbing, and destructive schemes?

217. Whether the national bank, projected by an anonymous writer in the latter end of Queen Anne's reign, might not on the other hand be attended with as great inconvenience by lodging too much power in the Government?

218. Whether the bank projected by Murray, though it partake, in many useful particulars, with that of Amsterdam, yet, as it placeth too great power in the hands of a private society, might not be dangerous to the public?

221. Whether those effects could have happened had there been no stock-jobbing? And whether stock-jobbing could at first have been set on foot, without an imaginary foundation of some improvement to the stock by trade? Whether, therefore, when there are no such prospects, or cheats, or private schemes proposed, the same effects can be justly feared?

222. Whether by a national bank, be not properly understood a bank, not only established by public authority as the Bank of England, but a bank in the hands of the public, wherein there are no shares: whereof the public alone is proprietor, and reaps all the benefit?

223. Whether, having considered the conveniences of banking and paper-credit in some countries, and the inconveniences thereof

in others, we may not contrive to adopt the former, and avoid the latter?

224. Whether great evils, to which other schemes are liable, may not be prevented, by excluding the managers of the bank from a share in the legislature?

226. Whether the bank proposed to be established in Ireland, under the notion of a national bank, by the voluntary subscription of three hundred thousand pounds, to pay off the national debt, the interest of which sum to be paid the subscribers, subject to certain terms of redemption, be not in reality a private bank, as those of England and Scotland, which are national only in name, being in the hands of particular persons, and making dividends on the money paid in by subscribers?

228. Whether it is not worth while to reflect on the expedients made use of by other nations, paper-money, bank-notes, public funds, and credit in all its shapes, to examine what hath been done and devised to add to our own animadversions, and upon the whole offer such hints as seem not unworthy the attention of the public?

230. Whether it may not be expedient to appoint certain funds or stock for a national bank, under direction of certain persons, one-third whereof to be named by the Government, and one-third by each House of Parliament?

231. Whether the directors should not be excluded from sitting in either House, and whether they should not be subject to the audit and visitation of a standing committee of both Houses?

232. Whether such committee of inspectors should not be changed every two years, one-half going out, and another coming in by ballot?

233. Whether the notes ought not to be issued in lots, to be let at interest on mortgaged lands, the whole number of lots to be divided among the four provinces, rateably to the number of hearths in each?

234. Whether it may not be expedient to appoint four counting-houses, one in each province, for converting notes into specie?

235. Whether a limit should not be fixed, which no person might exceed, in taking out notes?

236. Whether, the better to answer domestic circulation, it may not be right to issue notes as low as twenty shillings?

237. Whether all the bills should be issued at once, or rather by degrees, that so men may be gradually accustomed and reconciled to the bank?

238. Whether the keeping of the cash, and the direction of the bank, ought not to be in different hands, and both under public control?

239. Whether the same rule should not alway be observed, of lending out money or notes, only to half the value of the mortgaged land? and whether this value should alway be rated at the same number of years' purchase as at first?

240. Whether care should not be taken to prevent an undue rise of the value of land?

241. Whether the increase of industry and people will not of course raise the value of land? And whether this rise may not be sufficient?

242. Whether land may not be apt to rise on the issuing too great plenty of notes?

243. Whether this may not be prevented by the gradual and slow issuing of notes, and by frequent sales of lands?

244. Whether interest doth not measure the true value of land; for instance, where money is at five per cent., whether land is not worth twenty years' purchase?

245. Whether too small a proportion of money would not hurt the landed man, and too great a proportion the monied man? And whether the quantum of notes ought not to bear proportion to the public demand? And whether trial must not shew what this demand will be?

246. Whether the exceeding this measure might not produce divers bad effects, one whereof would be the loss of our silver?

247. Whether interest paid into the bank ought not to go on augmenting its stock?

248. Whether it would or would not be right to appoint that the said interest be paid in notes only?

249. Whether the notes of this national bank should not be received in all payments into the exchequer?

250. Whether on supposition that the specie should fail, the credit would not, nevertheless, still pass, being admitted in all payments of the public revenue?

251. Whether the public can become bankrupt so long as the notes are issued on good security?

252. Whether mismanagement, prodigal living, hazards by trade, which often affect private banks, are equally to be apprehended in a public one?

253. Whether as credit became current, and this raised the value of land, the security must not of course rise?

255. Whether by degrees, as business and people multiplied, more bills may not be issued, without augmenting the capital stock, provided still, that they are issued on good security; which further issuing of new bills, not to be without consent of Parliament?

256. Whether such bank would not be secure whether the profits accruing to the public would not be very considerable? And whether industry in private persons would not be supplied, and a general circulation encouraged?

257. Whether such bank should, or should not, be allowed to issue notes for money deposited therein? And, if not, whether the bankers would have cause to complain?

258. Whether, if the public thrives, all particular persons must not feel the benefit thereof, even the bankers themselves?

259. Whether, beside the bank company, there are not in England many private wealthy bankers, and whether they were more before the erecting of that company?

261. Whether we have not paper money circulating among us already; whether, therefore, we might not as well have that which is secured by the public, and whereof the public reaps the benefit?

262. Whether there are not two general ways of circulating money, to wit, play and traffic? and whether stock-jobbing is not to be ranked under the former?

263. Whether there are more than two things that might draw silver out of the bank, when its credit was once well established, to wit, foreign demands and small payments at home?

264. Whether, if our trade with France were checked, the former of these causes could be supposed to operate at all? and whether the latter could operate to any great degree?

273. Whether banks raised by private subscription would be as advantageous to the public as to the subscribers? and whether

risques and frauds might not be more justly apprehended from them?

276. Whether an argument from the abuse of things, against the use of them, be conclusive?

277. Whether he who is bred to a part be fitted to judge of the whole?

278. Whether interest be not apt to bias judgment? and whether traders only are to be consulted about trade, or bankers about money?

280. Whether any man hath a right to judge, that will not be at the pains to distinguish?

281. Whether there be not a wide difference between the profits going to augment the national stock, and being divided among private sharers? And whether, in the former case, there can possibly be any gaming or stock-jobbing?

289. Whether, therefore, it doth not greatly concern the State, that our Irish natives should be converted, and the whole nation united in the same religion, the same allegiance, and the same interest? and how this may most probably be effected?

291. Whether there have not been Popish recusants? and, if so, whether it would be right to object against the foregoing oath, that all would take it, and none think themselves bound by it?

292. Whether those of the Church of Rome, in converting the Moors of Spain or the Protestants of France, have not set us an example which might justify a similar treatment of themselves, if the laws of Christianity allowed thereof?

293. Whether compelling men to a profession of faith is not the worst thing in Popery; and, consequently, whether to copy after the Church of Rome therein, were not to become Papists curselves in the worst sense?

294. Whether, nevertheless, we may not imitate the Church of Rome, in certain places, where Jews are tolerated, by obliging our Irish Papists, at stated times, to hear Protestant sermons? and whether this would not make missionaries in the Irish tongue useful?

295. Whether the mere act of hearing, without making any profession of faith, or joining in any part of worship, be a religious act; and, consequently, whether their being obliged to hear, may not consist with the toleration of Roman Catholics?

296. Whether, if penal laws should be thought oppressive, we may not at least be allowed to give premiums? And whether it would be wrong, if the public encouraged Popish families to become hearers, by paying their hearth-money for them?

297. Whether in granting toleration, we ought not to distinguish between doctrines purely religious, and such as affect the State?

298. Whether the case be not very different in regard to a man who only eats fish on Fridays, says his prayers in Latin, or believes transubstantiation, and one who professeth in temporals a subjection to foreign powers, who holdeth himself absolved from all obedience to his natural prince and the laws of his country? who is even persuaded, it may be meritorious to destroy the powers that are?

299. Whether, therefore, a distinction should not be made between mere Papists and recusants? And whether the latter can expect the same protection from the Government as the former?

300. Whether our Papists in this kingdom can complain, if they are allowed to be as much Papists as the subjects of France or of the Empire?

301. Whether there is any such thing as a body of inhabitants, in any popish country under the sun, that profess an absolute submission to the Pope's orders in matters of an indifferent nature, or that in such points do not think it their duty to obey the civil government?

303. Whether every plea of conscience is to be regarded? Whether, for instance, the German Anabaptists, levellers, or fifth monarchy men would be tolerated on that pretence?

304. Whether Popish children bred in charity schools, when bound out in apprenticeship to Protestant masters, do generally continue Protestants?

306. Whether if the parents are overlooked, there can be any great hopes of success in converting the children?

312. Whether there be any nation of men governed by reason? And yet, if there was not, whether this would be a good argument against the use of reason in public affairs?

315. Whether one, whose end is to make his countrymen think, may not gain his end, even though they should not think as he doth?

316. Whether he, who only asks, asserts? and whether any man can fairly confute the querist?

317. Whether the interest of a part will not always be preferred to that of the whole?

SECOND PART. [PUBLISHED IN 1736.]

5. Whether it can be reasonably hoped, that our State will mend, so long as property is insecure among us?

6. Whether in that case the wisest government, or the best laws can avail us?

7. Whether a few mishaps to particular persons may not throw this nation into the utmost confusion?

8. Whether the public is not even on the brink of being undone by private accidents?

11. Whether therefore it be not high time to open our eyes?

24. Whether private ends are not prosecuted with more attention and vigour than the public? and yet, whether all private ends are not included in the public?

25. Whether banking be not absolutely necessary to the public weal?

26. Whether even our private banks, though attended with such hazards as we all know them to be, are not of singular use in defect of a national bank?

28. Whether the mystery of banking did not derive its original from the Italians? Whether this acute people were not, upon a time, bankers all over Europe? Whether that business was not practised by some of their noblest families who made immense profits by it, and whether to that the house of Medici did not originally owe its greatness?

30. Whether at Venice all payments of bills of exchange and merchants' contracts are not made in the national or public bank, the greatest affairs being transacted only by writing the names of the parties, one as debtor the other as creditor in the bank-book?

31. Whether nevertheless it was not found expedient to

provide a chest of ready cash for answering all demands that should happen to be made on account of payments in detail?

32. Whether this offer of ready cash, instead of transfers in the bank, hath not been found to augment rather than diminish the stock thereof?

33. Whether at Venice, the difference in the value of bank-money above other money be not fixed at twenty per cent.?

34. Whether the bank of Venice be not shut up four times in the year twenty days each time?

35. Whether by means of this bank the public be not mistress of a million and a half sterling?

38. Whether we may not hope for as much skill and honesty in a Protestant Irish Parliament as in a Popish Senate of Venice?

39. Whether besides coined money, there be not also great quantities of ingots or bars of gold and silver lodged in this bank?

41. Whether it be not true, that the bank of Amsterdam never makes payments in cash?

42. Whether, nevertheless, it be not also true, that no man who hath credit in the bank can want money from particular persons, who are willing to become creditors in his stead?

43. Whether any man thinks himself the poorer, because his money is in the bank?

44. Whether the creditors of the bank of Amsterdam are not at liberty to withdraw their money when they please, and whether this liberty doth not make them less desirous to use it?

45. Whether this bank be not shut up twice in the year for ten or fifteen days, during which time the accounts are balanced?

53. Whether we are by nature a more stupid people than the Dutch? And yet whether these things are sufficiently considered by our patriots?

54. Whether anything less than the utter subversion of those republics can break the banks of Venice and Amsterdam?

55. Whether at Hamburgh the citizens have not the management of the bank, without the meddling or inspection of the Senate?

56. Whether the directors be not four principal burghers chosen by plurality of voices, whose business is to see the rules observed, and furnish the cashiers with money?

57. Whether the book-keepers are not obliged to balance their accounts every week, and exhibit them to the controllers or directors?

58. Whether any besides the citizens are admitted to have compte en banc at Hamburgh?

59. Whether there be not a certain limit, under which no sum can be entered into the bank?

60. Whether each particular person doth not pay a fee in order to be admitted to a compte en banc at Hamburgh and Amsterdam?

61. Whether the effects lodged in the bank at Hamburgh are liable to be seized for debt or forfeiture?

62. Whether this bank doth not lend money upon pawns at low interest and only for half a year, after which term, in default of payment, the pawns are punctually sold by auction?

63. Whether the book-keepers of the bank of Hamburgh are not obliged upon oath never to reveal what sums of money are paid in or out of the bank, or what effects any particular person has therein?

64. Whether, therefore, it be possible to know the state or stock of this bank; and yet whether it be not of the greatest reputation and most established credit throughout the North?

66. Whether an absolute monarchy be so apt to gain credit, and whether the vivacity of some humours could so well suit with the slow steps and discreet management which a bank requires?

67. Whether the bank called the general bank of France, contrived by Mr. Law, and established by letters patent in May, 1716, was not in truth a particular and not a national bank, being in the hands of a particular company privileged and protected by the Government?

68. Whether the Government did not order that the notes of this bank should pass on a par with ready money in all payments of the revenue?

69. Whether this bank was not obliged to issue only such notes as were payable at sight?

70. Whether it was not made a capital crime to forge the notes of this bank?

71. Whether this bank was not restrained from trading either by sea or land, and from taking up money upon interest?

72. Whether the original stock thereof was not six millions of livres, divided into actions of a thousand crowns each?

73. Whether the proprietors were not to hold general assemblies twice in the year, for the regulating their affairs?

74. Whether the accompts of this bank were not balanced twice every year?

75. Whether there were not two chests belonging to this bank, the one called the general chest containing their specie, their bills and their copper plates for the printing of those bills, under the custody of three locks, whereof the keys were kept by the director, the inspector and treasurer; also another called the ordinary chest, containing part of the stock not exceeding two hundred thousand crowns, under the key of the treasurer?

76. Whether out of this last mentioned sum, each particular cashier was not to be intrusted with a share not exceeding the value of twenty thousand crowns at a time, and that under good security?

77. Whether the regent did not reserve to himself the power of calling this bank to account, so often as he should think good, and of appointing the inspector?

78. Whether in the begining of the year 1719 the French King did not convert the general bank of France into a Banque Royale, having himself purchased the stock of the company and taken it into his own hands, and appointed the Duke of Orleans chief manager thereof?

79. Whether from that time, all matters relating to the bank were not transacted in the name, and by the sole authority, of the king?

80. Whether his majesty did not undertake to receive and keep the cash of all particular persons, subjects, or foreigners, in his said Royale Banque, without being paid for that trouble? And whether it was not declared, that such cash should not be liable to seizure on any pretext, not even on the king's own account?

81. Whether the treasurer alone did not sign all the bills, receive all the stock paid into the bank, and keep account of all the in-goings and out-goings?

82. Whether there were not three registers for the enregistering of the bills kept in the Banque Royale, one by the inspector, and the other by the controller, and a third by the treasurer?

83. Whether there was not also a fourth register, containing the profits of the bank, which was visited, at least once a week, by the inspector and controller?

84. Whether, beside the general bureau or compter in the city of Paris, there were not also appointed five more in the towns of Lyons, Tours, Rochelle, Orleans, and Amiens, each whereof was provided with two chests, one of specie for discharging bills at sight, and another of bank bills to be issued as there should be demand?

85. Whether, in the above mentioned towns, it was not prohibited to make payments in silver, exceeding the sum of six hundred livres?

86. Whether all creditors were not empowered to demand payment in bank bills instead of specie?

87. Whether, in a short compass of time, this bank did not undergo many new changes and regulations by several successive acts of council?

88. Whether the untimely, repeated, and boundless fabrication of bills did not precipitate the ruin of this bank?

89. Whether it be not true, that before the end of July, 1719, they had fabricated four hundred millions of livres in bank-notes, to which they added the sum of one hundred and twenty millions more on the twelfth of September following, also the same sum of one hundred and twenty millions on the twenty-fourth of October, and again on the twenty-ninth of December, in the same year, the farther sum of three hundred and sixty millions, making the whole, from an original stock of six millions, mount, within the compass of one year, to a thousand millions of livres?

90. Whether on the twenty-eighth of February, 1720, the king did not make an union of the bank with the united company of East and West Indies, which from that time had the administration and profits of the Banque Royal?

91. Whether the king did not still profess himself responsible for the value of the bank-bills, and whether the company were not responsible to his majesty for their management?

92. Whether sixteen hundred millions of livres, lent to his majesty by the company, was not a sufficient pledge to indemnify the king?

93. Whether the new directors were not prohibited to make any more bills without an act of council?

94. Whether the chests and books of the Banque were not subjected to the joint inspection of a counsellor of state, and the Prevôt des Marchands, assisted by two Echevins, a judge, and a consul, who had power to visit when they would and without warning?

95. Whether in less than two years the actions or shares of the Indian Company (first established for Mississippi, and afterwards increased by the addition of other companies and further privileges) did not rise to near 2000 per cent.? and whether this must be ascribed to real advantages of trade, or to mere frenzy?

96. Whether, from first to last, there were not fabricated bank bills, of one kind or other, to the value of more than two thousand and six hundred millions of livres, or one hundred and thirty millions sterling?

97. Whether the credit of the bank did not decline from its union with the Indian Company?

98. Whether, notwithstanding all the above-mentioned extraordinary measures, the bank bills did not still pass at par with gold and silver to May, 1720, when the French king thought fit, by a new act of council, to make a reduction of their value, which proved a fatal blow, the effects whereof, though soon retracted, no subsequent skill or management could ever repair?

99. Whether, what no reason, reflection, or foresight could do, this simple matter of fact (the most powerful argument with the multitude) did not do at once, to wit, open the eyes of the people?

100. Whether the dealers in that sort of ware had ever troubled their heads with the nature of credit, or the true use and end of banks, but only considered their bills and actions as things, to which the general demand gave a price?

101. Whether the Government was not in great perplexity to contrive expedients for the getting rid of those bank bills, which had been lately multiplied with such an unlimited passion?

102. Whether notes to the value of about ninety millions were not sunk by being paid off in specie, with the cash of the Compagnie des Indes with that of the bank, and that of the Hotels des Monnoyes? Whether five hundred and thirty millions were not converted into annuities at the royal treasury? Whether several hundred millions more in bank bills were not extinguished and

replaced by annuities on the City of Paris on taxes throughout the provinces, &c., &c.

103. Whether, after all other shifts, the last and grand resource for exhausting that ocean, was not the erecting of a compte en banc in several towns of France?

104. Whether, when the imagination of a people is thoroughly wrought upon and heated by their own example, and the arts of designing men, this doth not produce a sort of enthusiasm which takes place of reason, and is the most dangerous distemper in a state?

105. Whether this epidemical madness should not be always before the eyes of a legislature, in the framing of a national bank?

106. Whether, therefore, it may not be fatal to engraft trade on a national bank, or to propose dividends on the stock thereof?

108. Whether it may not be as useful a lesson to consider the bad management of some as the good management of others?

109. Whether the rapid and surprising success of the schemes of those who directed the French bank did not turn their brains?

110. Whether the best institutions may not be made subservient to bad ends?

111. Whether, as the aim of industry is power, and the aim of a bank is to circulate and secure this power to each individual, it doth not follow that absolute power in one hand is inconsistent with a lasting and flourishing bank?

115. Whether the mistaking of the means for the end was not a fundamental error in the French councils?

123. Whether there should not be a constant care to keep the bills at par?

124. Whether, therefore, bank bills should at any time be multiplied but as trade and business were also multiplied?

125. Whether it was not madness in France to mint bills and actions, merely to humour the people and rob them of their cash?

126. Whether we may not profit by their mistakes, and as some things are to be avoided, whether there may not be others worthy of imitation in the conduct of our neighbours?

127. Whether the way be not clear and open and easie, and whether anything but the will is wanting to our legislature?

128. Whether jobs and tricks are not detested on all hands, but whether it be not the joint interest of prince and people to promote industry?

129. Whether, all things considered, a national bank be not the most practicable, sure, and speedy method to mend our affairs, and cause industry to flourish among us?

130. Whether a compte en banc or current bank bills would best answer our occasions?

131. Whether a public compte en banc, where effects are received, and accounts kept with particular persons, be not an excellent expedient for a great city?

132. What effect a general compte en banc would have in the metropolis of this kingdom with one in each province subordinate thereunto?

133. Whether it may not be proper for a great kingdom to unite both expedients, to wit, bank notes and a compte en banc?

134. Whether, nevertheless, it would be adviseable to begin with both at once, or rather to proceed first with the bills, and afterwards, as business multiplied, and money or effects flowed in, to open the compte en banc?

135. Whether, for greater security, double books of compte en banc should not be kept in different places and hands?

136. Whether it would not be right to build the compters and public treasuries, where books and bank notes are kept, without wood, all arched and floored with brick or stone, having chests also and cabinets of iron?

137. Whether divers registers of the bank notes should not be kept in different hands?

138. Whether there should not be great discretion in the uttering of bank notes, and whether the attempting to do things *per saltum* be not often the way to undo them?

139. Whether the main art be not by slow degrees and cautious measures to reconcile the bank to the public, to wind it insensibly into the affections of men, and interweave it with the constitution?

141. Whether a national bank may not prevent the drawing of specie out of the country (where it circulates in small payments), to be shut up in the chests of particular persons?

143. Whether tenants or debtors could have cause to complain

of our monies being reduced to the English value if it were withal multiplied in the same, or in a greater proportion? and whether this would not be the consequence of a national bank?

144. If there be an open sure way to thrive, without hazard to ourselves or prejudice to our neighbours, what should hinder us from putting in practice?

145. Whether in so numerous a Senate, as that of this kingdom, it may not be easier to find men of pure hands and clear heads fit to contrive and model a public bank?

146. Whether a view of the precipices be not sufficient, or whether we must tumble headlong before we are roused?

147. Whether in this drooping and dispirited country, men are quite awake?

156. Whether, if we do not reap the benefits that may be made of our country and government, want of will in the lower people, or want of wit in the upper, be most in fault?

165. Whether an assembly of freethinkers, *petit maitres*, and smart fellows, would not make an admirable Senate?

175. Whether there be really among us any persons so silly, as to encourage drinking in their children?

176. Whence it is, that our ladies are more alive, and bear age so much better than our gentlemen?

185. Whether this be altogether their own fault?

197. Whether it may not be right to appoint censors in every parish to observe and make returns of the idle hands?

198. Whether a register or history of the idleness and industry of a people would be an useless thing?

199. Whether we are apprized, of all the uses that may be made of political arithmetic?

207. Why the workhouse in Dublin, with so good an endowment, should yet be of so little use? and whether this may not be owing to that very endowment?

208. Whether that income might not, by this time, have gone through the whole kingdom, and erected a dozen workhouses in every county?

210. Whether the tax on chairs or hackney coaches be not paid, rather by the country gentlemen, than the citizens of Dublin?

227. Whether there should not be a difference between the treatment of criminals and that of other slaves?

251. Whether when a motion was once upon a time to establish a private bank in this kingdom by public authority, divers gentlemen did not shew themselves forward to embark in that design?

252. Whether it may not now be hoped that our patriots will be as forward to examine and consider the proposal of a public bank calculated only for the public good?

253. Whether any people upon earth shew a more early zeal for the service of their country, greater eagerness to bear a part in the Legislature, or a more general parturiency with respect to politicks and public counsels?

254. Whether, nevertheless, a light and ludicrous vein be not the reigning humour; but whether there was ever greater cause to be serious?

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13. Whether the whole city of Amsterdam would not have been troubled to have brought together twenty thousand pounds in one room?

14. Whether it be not absolutely necessary that there must be a bank and must be a trust? And, if so, whether it be not the most safe and prudent course to have a national bank and trust the legislature?

15. Whether objections against trust in general avail, when it is allowed there must be a trust, and the only question is where to place this trust, whether in the legislature or in private hands?

16. Whether it can be expected that private persons should have more regard to the public than the public itself?

17. Whether, if there be hazards from mismanagement, those may not be provided against in the framing of a public bank; but whether any provision can be made against the mismanagement of private banks that are under no check, control, or inspection?

18. Whatever may be said for the sake of objecting, yet, whether it be not false in fact, that men would prefer a private security to a public security?

19. Whether a national bank ought to be considered as a new experiment; and whether it be not a motive to try this scheme that it hath been already tried with success in other countries?

20. If power followeth money, whether this can be anywhere more properly and securely placed, than in the same hands wherein the supreme power is already placed?

21. Whether there be more danger of abuse in a private than in a public management?

22. Whether the proper usual remedy for abuses of private banks be not to bring them before Parliament, and subject them to the inspection of a committee; and whether it be not more prudent to prevent than to redress an evil?

24. Whether experience and example be not the plainest proof; and whether any instance can be assigned where a national bank hath not been attended with great advantage to the public?

25. Whether the evils apprehended from a national bank are not much more to be apprehended from private banks; but whether men by custom are not familiarized and reconciled to common dangers, which are therefore thought less than they really are?

26. Whether it would not be very hard to suppose all sense, honesty, and public spirit were in the keeping of only a few private men, and the public was not fit to be trusted?

27. Whether it be not ridiculous to suppose a legislature should be afraid to trust itself?

28. But, whether a private interest be not generally supported and pursued with more zeal than a public?

30. Whether, nevertheless, the community of danger, which lulls private men asleep, ought not to awaken the public?

31. Whether there be not less security where there are more temptations and fewer checks?

32. If a man is to risque his fortune, whether it be more prudent to risque it on the credit of private men, or in that of the great assembly of the nation?

33. Where is it most reasonable to expect wise and punctual dealing, whether in a secret impenetrable recess, where credit depends on secrecy, or in a public management regulated and inspected by Parliament?

34. Whether a supine security be not catching, and whether numbers running the same risque, as they lessen the caution, may not increase the danger?

35. What real objection lies against a national bank erected by the legislature, and in the management of public deputies, appointed and inspected by the legislature?

36. What have we to fear from such a bank, which may not be as well feared without it?

37. How, why, by what means, or for what end, should it become an instrument of oppression?

38. Whether we can possibly be on a more precarious foot than we are already? Whether it be not in the power of any particular person at once to disappear and convey him self into foreign parts? or whether there can be any security in an estate of land when the demands upon it are unknown?

39. Whether the establishing of a national bank, if we suppose a concurrence of the government, be not very practicable?

40. But, whether though a scheme be never so evidently practicable and useful to the public, yet, if conceived to interfere with a private interest, it be not forthwith in danger of appearing doubtful, difficult, and impracticable?

41. Whether the legislative body hath not already sufficient power to hurt, if they may be supposed capable of it, and whether a bank would give them any new power?

42. What should tempt the public to defraud itself?

43. Whether, if the legislature destroyed the public, it would not be *felo de se*; and whether it be not reasonable to suppose it bent on its own destruction?

44. Whether the objection to a public national bank, from want of secrecy, be not in truth an argument for it?

45. Whether the secrecy of private banks be not the very thing that renders them so hazardous? and whether, without, that there could have been of late so many sufferers?

46. Whether when all objections are answered it be still incumbent to answer surmises?

47. Whether it were just to insinuate that gentlemen would be against any proposal they could not turn into a jobb?

48. Suppose the legislature passed their word for any private banker, and regularly visited his books, would not money lodged in his bank be therefore reckoned more secure?

49. In a country where the legislative body is not fit to be trusted, what security can there be for trusting any one else?

50. If it be not ridiculous to question whether the public can find cash to circulate bills of a limited value when private bankers are supposed to find enough to circulate them to an unlimited value?

53. Whether those hazards that in a greater degree attend private banks can be admitted as objections against a public one?

54. Whether that which is an objection to everything be an objection to anything; and whether the possibility of an abuse be not of that kind?

55. Whether, in fact, all things are not more or less abused, and yet notwithstanding such abuse, whether many things are not upon the whole expedient and useful?

56. Whether those things that are subject to the most general inspection are not the less subject to abuse?

57. Whether, for private ends, it may not be sometimes expedient to object novelty to things that have been often tried, difficulty to the plainest things, and hazard to the safest?

58. Whether some men will not be apt to argue as if the question was between money and credit, and not (as in fact it is) which ought to be preferred, private credit or public credit?

59. Whether they will not prudently overlook the evils felt, or to be feared, on one side?

60. Whether, therefore, those that would make an impartial judgment ought not to be on their guard, keeping both prospects always in view, balancing the inconveniences on each side and considering neither absolutely?

61. Whether wilful mistakes, examples without a likeness, and general addresses to the passions are not often more successful than arguments?

62. Whether there be not an art to puzzle plain cases as well as to explain obscure ones?

63. Whether private men are not often an over-match for the public; want of weight being made up for by activity?

64. If we suppose neither sense nor honesty in our leaders or representatives, whether we are not already undone, and so have nothing further to fear?

65. Suppose a power in the government to hurt the public by means of a national bank, yet what should give them the will to do this? Or supposing a will to do mischief, yet how could a national bank, modelled and administered by Parliament, put it in their power?

66. Whether even a wicked will intrusted with power can be supposed to abuse it for no end?

67. Whether it be not much more probable that those who maketh such objections do not believe them?

68. Whether it be not vain to object that our fellow-subjects of Great Britain would malign or obstruct our industry when it is exerted in a way which cannot interfere with their own?

69. Whether it is to be supposed they should take delight in the dirt and nakedness and famine of our people, or envy them shoes for their feet and beef for their bellies?

70. What possible handle or inclination could our having a national bank give other people to distress us?

71. Whether it be not ridiculous to conceive that a project for cloathing and feeding our natives should give any umbrage to England?

72. Whether such unworthy surmises are not the pure effect of spleen?

78. Whether the Protestant colony in this kingdom can ever forget what they owe to England?

79. Whether there ever was in any part of the world a country in such wretched circumstances, and which, at the same time, could be so easily remedied, and nevertheless the remedy not applied?

80. What must become of a people that can neither see the plainest things nor do the easiest?

81. Be the money lodged in the bank what it will, yet whether an Act to make good deficiencies would not remove all scruples?

82. If it be objected that a national bank must lower interest, and therefore hurt the monied man, whether the same objection

would not hold as strong against multiplying our gold and silver?

83. But whether a bank that utters bills, with the sole view of promoting the public weal, may not so proportion their quantity as to avoid several inconveniences which might attend private banks?

85. Whether anything be more reasonable than that the public, which makes the whole profit of the bank, should engage to make good its credit?

88. Whether, in order to make men see and feel, it be not often necessary to inculcate the same thing, and place it in different lights?

90. Whether the managers and officers of a national bank ought to be considered otherwise than as the cashiers and clerks of private banks? whether they are not in effect as little trusted, have as little power, are as much limited by rules, and as liable to inspection?

91. Whether the mistaking this point may not create some prejudice against a national bank, as if it depended on the credit, or wisdom, or honesty, of private men, rather than on the public, which is really the sole proprietor and director thereof, and as such obliged to support it?

93. Whether a national bank would not be the great means and motive for employing our poor in manufactures?

94. Whether money, though lent out only to the rich, would not soon circulate among the poor? And whether any man borrows but with an intent to circulate?

95. Whether both government and people would not in the event be gainers by a national bank? And whether anything but wrong conceptions of its nature can make those that wish well to either averse from it?

96. Whether it may not be right to think, and to have it thought, that England and Ireland, prince and people, have one and the same interest?

97. Whether, if we had more means to set on foot such manufactures and such commerce as consists with the interest of England, there would not of course be less sheep-walks and less wool exported to foreign countries? And whether a national bank would not supply such means?

104. Whether our circumstances do not call aloud for some present remedy? And whether that remedy be not in our power?

106. Whether, of all the helps to industry that ever were invented, there be any more secure, more easy, and more effectual than a national bank?

107. Whether medicines do not recommend themselves by experience, even though their reasons be obscure? But whether reason and fact are not equally clear in favour of this political medicine?

117. Whether therefore a tax on all gold and silver in apparel, on all foreign laces and silks, may not raise a fund for the bank, and at the same time have other salutary effects on the public?

118. But, if gentlemen had rather tax thousands in another way, whether an additional tax of ten shillings the hogshead on wines may not supply a sufficient fund for the national bank, all defects to be made good by Parliament?

119. Whether upon the whole it may not be right to appoint a national bank?

120. Whether the stock and security of such bank would not be, in truth, the national stock, or the total sum of the wealth of this kingdom?

121. Whether, nevertheless, there should not be a particular fund for present use in answering bills and circulating credit?

122. Whether for this end any fund may not suffice, provided an Act be passed for making good deficiencies?

123. Whether the sole proprietor of such bank should not be the public, and the sole director the legislature?

124. Whether the managers, officers, and cashiers should not be servants of the public, acting by orders and limited by rules of the legislature?

125. Whether there should not be a standing number of inspectors, one-third men in great office, the rest members of both houses, half whereof to go out, and half to come in every session?

126. Whether those inspectors should not, all in a body, visit twice a year, and three as often as they pleased?

127. Whether the general bank should not be in Dublin, and subordinate banks or compters one in each province of Munster, Ulster, and Connaught?

128. Whether there should not be such provisions of stamps,

signatures, checks, strong boxes, and all other measures for securing the bank notes and cash, as are usual in other banks?

129. Whether these ten or a dozen last queries may not easily be converted into heads of a bill?

130. Whether any one concerns himself about the security or funds of the bank of Venice or Amsterdam? And whether in a little time the case would not be the same as to our bank?

133. Whether it be not the most obvious remedy for all the inconveniences we labour under with regard to our coin?

134. Whether it be not agreed on all hands that our coin is on very bad foot, and calls for some remedy?

135. Whether the want of silver hath not introduced a sort of traffick for change, which is purchased at no inconsiderable discount to the great obstruction of our domestic commerce?

136. Whether, though it be evident silver is wanted, it be yet so evident which is the best way of providing for this want? Whether by lowering the gold, or raising the silver, or partly one, partly the other?

137. Whether a partial raising of one species be not, in truth, granting a premium to our bankers for importing such species? And what that species is which deserves most to be encouraged?

138. Whether it be not just that all gold should be alike rated according to its weight and fineness?

139. Whether this may be best done by lowering some certain species of gold, or by raising others, or by joining both methods together?

141. Whether the North and the South have not, in truth, one and the same interest in this matter?

143. But, whether a public benefit ought to be obtained by unjust methods, and therefore, whether any reduction of coin should be thought of which may hurt the properties of private men?

144. Whether those parts of the kingdom where commerce doth most abound would not be the greatest gainers by having our coin placed on a right foot?

145. Whether, in case a reduction of coin be thought expedient, the uttering of bank bills at the same time may not prevent the inconveniences of such a reduction?

146. But, whether any public expediency could countervail a

real pressure on those who are least able to bear it, tenants and debtors?

147. Whether, nevertheless, the political body, as well as the natural, must not sometimes be worse in order to be better?

150. What if our other gold were raised to a par with Portugal gold, and the value of silver in general raised with regard to that of gold?

151. Whether the public ends may or may not be better answered by such argumentation, than by a reduction of our coin?

152. Provided silver is multiplied, be it by raising or diminishing the value of our coin, whether the great end is not answered?

154. Whether, if a reduction be thought necessary, the obvious means to prevent all hardships and injustice be not a national bank?

155. Upon supposition that the cash of this kingdom was five hundred thousand pounds, and by lowering the various species each one-fifth of its value the whole sum was reduced to four hundred thousand pounds, whether the difficulty of getting money, and consequently of paying rents, would not be increased in the proportion of five to four?

156. Whether such difficulty would not be a great and unmerited distress on all the tenants in the nation? But if at the same time with the aforesaid reduction there were uttered one hundred thousand pounds additional to the former current stock, whether such difficulty or inconvenience would then be felt?

158. Whether in any foreign market, twopence advance in a kilderkin of corn could greatly affect our trade?

159. Whether in regard of the far greater changes and fluctuations of price from the difference of seasons and other accidents, that small rise should seem considerable?

162. Whether, setting aside the assistance of a national bank, it will be easy to reduce or lower our coin without some hardship (at least for the present) on a great number of particular persons?

163. Whether, nevertheless, the scheme of a national bank doth not intirely stand clear of this question; and whether such bank may not compleatly subsist and answer its ends, although there should be no alteration at all made in the value of our coin?

164. Whether, if the ill state of our coin be not redressed, that scheme would not be still more necessary, inasmuch as a national bank, by putting new life and vigour into our commerce, may prevent our feeling the ill effects of the want of such redress?

165. Whether men united by interest are not often divided by opinion; and whether such difference in opinion be not an effect of misapprehension?

166. Whether two things are not manifest, first, that some alteration in the value of our coin is highly expedient, secondly, that whatever alteration is made, the tenderest care should be had of the properties of the people, and even a regard paid to their prejudices?

167. Whether our taking the coin of another nation for more than it is worth be not, in reality and in event, a cheat upon ourselves?

168. Whether a particular coin over-rated will not be sure to flow in upon us from other countries beside that where it is coined?

169. Whether, in case the wisdom of the nation shall think fit to alter our coin, without erecting a national bank, the rule for lessening or avoiding present inconvenience should not be so to order matters, by raising the silver and depressing the gold, as that the total sum of coined cash within the kingdom shall, in denomination, remain the same, or amount to the same nomimal value, after the change it did before?

170. Whether all inconvenience ought not to be lessened as much as may be; but after, whether it would be prudent, for the sake of a small inconvenience, to obstruct a much greater good? And whether it may not sometimes happen that an inconvenience which in fancy and general discourse seems great shall, when accurately inspected and cast up, appear inconsiderable?

171. Whether in public councils the sum of things, here and there, present and future, ought not to be regarded?

176. Money being a ticket which entitles to power and records the title, whether such power avails otherwise than as it is exerted into act?

180. Whether beside that value of money which is rated by weight, there be not also another value consisting in its aptness to circulate?

204. Whether there be any woollen manufacture in Birmingham?

205. Whether bad management may not be worse than slavery? And whether any part of Christendom be in a more languishing condition than this kingdom?

212. Whether it be not true, that within the compass of one year there flowed from the South Sea, when that commerce was open, into the single town of St. Malo's, a sum of gold and silver equal to four times the whole species of this kingdom? And whether that same part of France doth not at present draw from Cadiz upwards of two hundred thousand pounds per annum?

214. Whether it be true that the Dutch make ten millions of livres, every return of the flota and galleons, by their sales at the Indies and at Cadiz?

215. Whether it be true that England makes at least one hundred thousand pounds per annum by the single article of hats sold in Spain?

217. Whether the toys of Thiers do not employ five thousand families?

218. Whether there be not a small town or two in France which supply all Spain with cards?

222. Whether, about twenty-five years ago, they did not first attempt to make porcelain in France; and whether, in a few years, they did not make it so well, as to rival that which comes from China?

226. Whether part of the profits of the bank should not be employed in erecting manufactures of several kinds, which are not likely to be set on foot and carried on to perfection without great stock, public encouragement, general regulations, and the concurrence of many hands?

230. Whether it were not to be wished that our people shewed their descent from Spain, rather by their honour and honesty than their pride, and if so, whether they might not easily insinuate themselves into a larger share of the Spanish trade?

235. Whether we may not, with common industry and common honesty, undersell any nation in Europe?

242. Whether they are not the Swiss that make hay and gather in the harvest throughout Alsatia?

269. Whether commissioners of trade or other proper persons should not be appointed to draw up plans of our commerce both

foreign and domestic, and lay them at the beginning of every session before the Parliament?

270. Whether registers of industry should not be kept, and the public from time to time acquainted what new manufactures are introduced, what increase or decrease of old ones?

286. Whether therefore Misisipi, South Sea, and such like schemes were not calculated for public ruin?

289. Whether all such princes and statesmen are not greatly deceived who imagine that gold and silver, any way got, will enrich a country?

292. Whether the effect is not to be considered more than the kind or quantity of money?

299. Whether those who have the interests of this kingdom at heart, and are concerned in the councils thereof, ought not to make the most humble and earnest representations to his Majesty, that he may vouchsafe to grant us that favour, the want of which is ruinous to our domestic industry, and the having of which would interfere with no interest of our fellow-subjects?

301. Whether his most gracious Majesty hath ever been addressed on this head in a proper manner, and had the case fairly stated for his royal consideration, and if not, whether we may not blame ourselves?

311. Whether every kind of employment or business, as it implies more skill and exercise of the higher powers, be not more valued?

316. Whether private endeavours without assistance from the public are likely to advance our manufactures and commerce to any great degree? But whether, as bills uttered from a national bank upon private mortgages would facilitate the purchases and projects of private men, even so the same bills uttered on the public security alone may not answer public ends in promoting new works and manufactures throughout the kingdom?

323. Whether as many as wish well to their country ought not to aim at increasing its momentum?

B.

FIRST EDITION OF THE 'MAXIMS CONCERNING PATRIOTISM.'

[In the collection of pamphlets which contains the three original Parts of the *Querist*, I found also the First edition of the *Maxims concerning Patriotism*, published in 1750. Curiously, it bears on the title-page to be 'By a Lady.' Maxims 17, 18, 19, in the edition published two years afterwards in the *Miscellany* by Berkeley, are not found in the original edition. In 16, instead of a 'suspected patriot,' the 1750 edition has a 'bad patriot;' and in 26, instead of 'the present age,' the same edition has 'the present merry age'—and the Maxim is 23.

A. C. F.]

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